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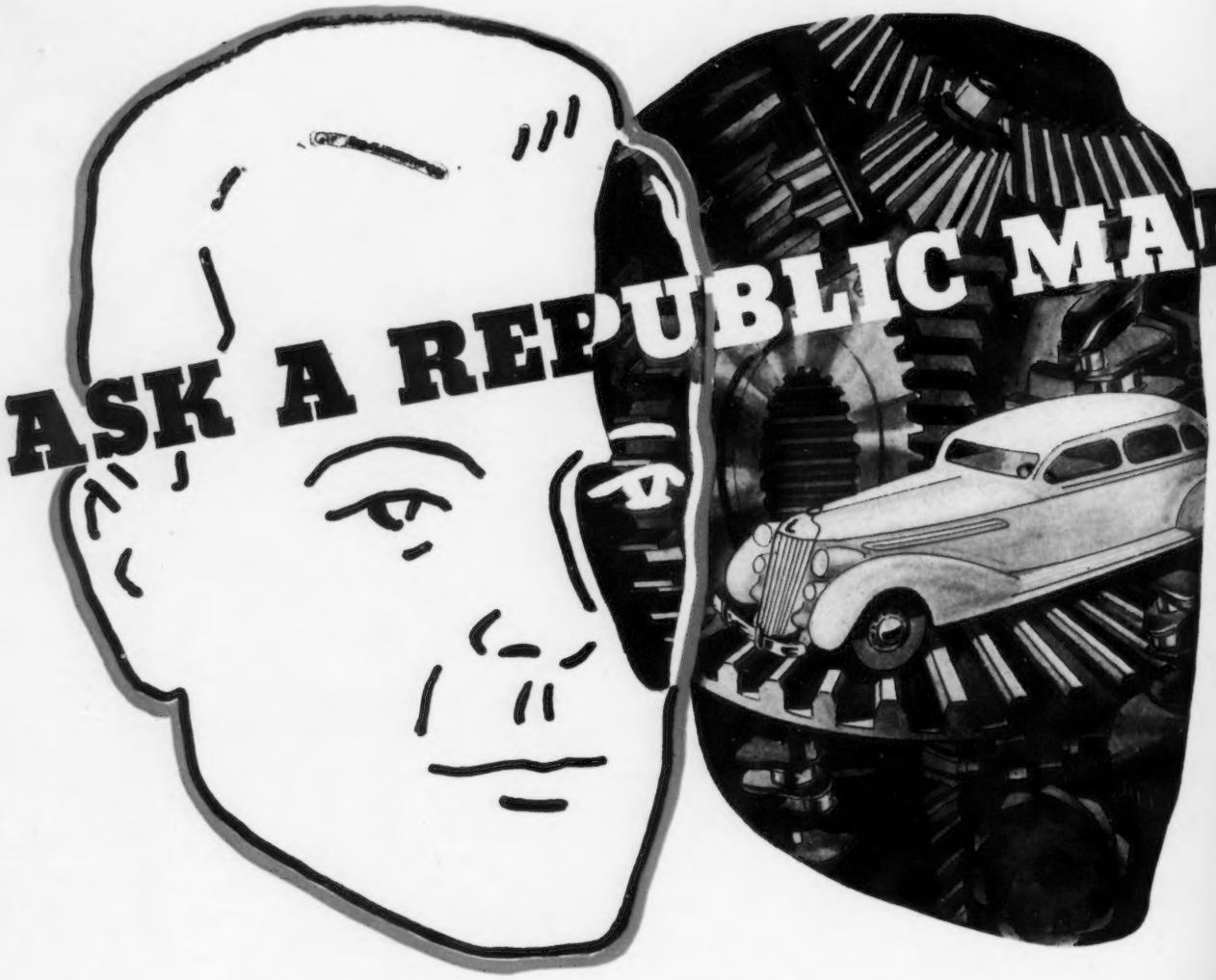

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K MONEL

A New Hardenable, Non-ferrous Alloy, Combining Great Strength and Hardness with High Corrosion Resistance

Composition

K Monel is a new hardenable alloy made from Monel Metal by introducing small quantities of aluminum. K Monel has all the corrosion resistance of Monel Metal, and, through heat treatment, proportional limits in excess of 100,000 p.s.i. may be developed and hardnesses over 325 Brinell. The following analysis is typical—

Nickel	63.32%	Manganese	.50%
Copper	30.84%	Carbon	.16%
Aluminum	3.45%	Silicon	.20%
Iron	1.50%	Sulfur	.005%

Heat Treatment

Hardening is accomplished by heating to 1080–1100° F. and holding at this temperature in accordance with Figure 1. Softening is accomplished by quenching from 1450° F. This operation should not be done unless the alloy is to be prepared for further cold working as quenching is a preliminary operation in mill production.

After quenching, the metal is soft (140–150 BHN) and it may be readily cold worked. Any hardening that results from the cold working is retained during the reheating and holding, which further increases the hardness. Hardnesses well above 325 BHN and proportional limits well above 100,000 p.s.i. may be developed in this manner, which combines the hardening effects of cold work and heat treatment.

Heat treated K Monel may be partially softened by heating the metal to 1200–1400° F. and cooling in air. Fig. 2 shows the relation of heating temperature to hardness obtained in partial softening. To obtain complete softening, the metal is quenched in water or oil from 1450° F. or higher.

Close temperature control is essential in heat treating K Monel and proper heating is important as outlined under forging. About one hour per inch of diameter or thickness is required to bring the metal to uniform temperature.

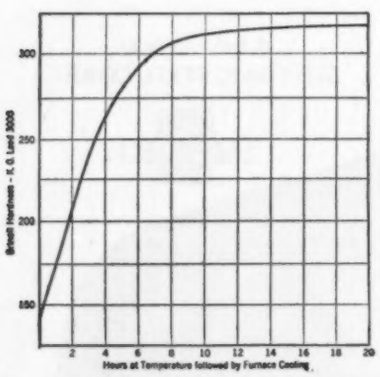

Fig. 1. Relation of hardness to holding time at 1080°–1100° F.

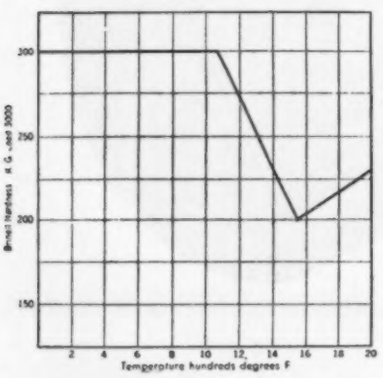

Fig. 2. Relation of heating temperature to hardness, in partial softening of K Monel

Grades and Properties

K Monel is supplied in four hardness grades having the mechanical properties shown in the table. Grade A is hot rolled and quenched to obtain softness. Grade B is obtained by cold drawing or cold rolling grade A material. Grades C and D are produced by heat treating grades A and B respectively. Grade B may be produced also by a special heat treatment of grade A. Figure 3 shows the approximate relations between hardness and properties.

K Monel is supplied in most mill forms. For details, consult your nearest source of supply shown on the back of this page.

Hardness Grade	Tensile Strength p. s. i.	Yield Strength (0.5% set) p. s. i.	Proportional Limit p. s. i.	Elongation % in 2"	Brinell Hardness 3000 Kg.
A	120000 max.	80000 max.	60000 max.	40 min.	Softer than 215
B	120000 min. 140000 max.	80000 min. 100000 max.	60000 min. 80000 max.	30 min.	215-265
C	140000 min. 160000 max.	100000 min. 120000 max.	80000 min. 100000 max.	20 min.	265-315
D	160000 min.	120000 min.	100000 min.	15 min.	Harder than 315

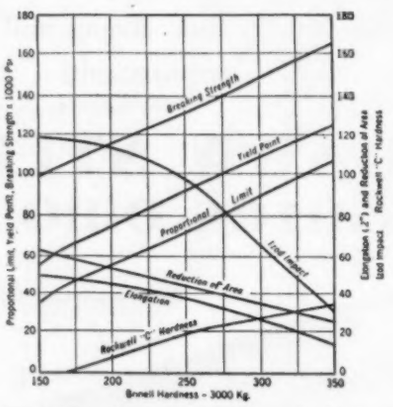

Fig. 3. Approximate relation between hardness and mechanical properties of K Monel.

Endurance Limit

The endurance limit, as determined by a special machine for testing flat strips, is 36,500 p.s.i. at 10^8 cycles for Grade C and 26,000 p.s.i. for Grade A. The corresponding values are 24,500 p.s.i. for 10 B&S numbers hard phosphor bronze and 20,000 p.s.i. for soft phosphor bronze.

Physical Constants

Density.....8.58; or 0.31 lb. per cu. in.
Melting Point...1315–1350° C. or 2400–2460° F.

Specific Heat (20–400° C.).....0.127

Coefficient of Expansion
25–100° C.....0.000014
25–300° C.....0.000015
25–600° C.....0.000016

Thermal Conductivity (c.g.s.).....0.06

Electrical Resistivity at 0° C.
Grade A.....62.8 microhms per cm. cube
Grade C.....62.0 microhms per cm. cube
Grade D.....61.9 microhms per cm. cube
Grade A.....378 ohms per circular mil-foot
Grade C.....373 ohms per circular mil-foot
Grade D.....367 ohms per circular mil-foot

Temperature Coefficient
0.000019 per ° C. or 0.00011 per ° F.

Elastic Modulus.....26,000,000
Torsional Modulus.....9,500 000

Fabrication

K Monel is fabricated by the methods outlined below. Further information is given in bulletin T-9, available on request.

Forging: Practically any shape forgeable in steel can be forged in K Monel. The forging range is 1700–2175° F. Proper heating is important. Avoid exposing the hot metal to sulfurous heating atmospheres or other sources of sulfur. Use a furnace so designed that the flame does not impinge directly on the metal and maintain a slightly reducing (2–5% excess CO) furnace atmosphere. Charge the metal to a hot furnace maintained at 2200–2250° F. and remove the work on a rising temperature never in excess of 2200° F. Material that is later to be heat treated must be quenched in water or oil from above 1450° F. Pickling after hot working is facilitated by quenching in water to which is added 1–2% by volume methyl alcohol. Bulletin T-9 gives pickling formulae.

Machinability: Hardness grades A, B and C are machinable. Better finish is obtained with Grade C than with the softer grades. Cutting speeds for Grade C are about half those used for machinery steels: higher speeds can be used on lathe work. The tools used are of tough high speed steel, such as Rex AA of the high tungsten low vanadium 18–4–1 type. Sulfurized mineral oil is used abundantly as a cutting lubricant. The springy chip from K Monel requires attention to prevent gouging the work. A sheet metal shield can be used to keep the chip out of the way.

Tool design is important. Blunt tools are used and they are ground to provide good support for the cutting edge. The back clearance is ground plane at a 7° angle with the perpendicular and it has been found highly advantageous especially on milling cutters and hobs, to grind a small land 1/32"–3/64" wide at the cutting edge, the plane of the land being exactly perpendicular. On circular tools this land is ground circumferentially. The top and side clearances may be varied to suit the work. Side clearances range from 7° to 9° and top clearances from 12° to 14°.

Cutting lubricants must be removed thoroughly from parts that are to be heat treated after machining.

Silver Soldering and Welding: K Monel is silver soldered using Easy-Flo Solder and Handy Flux, both of which are obtained from Handy and Harman, 82 Fulton Street, New York, N. Y.

K Monel can be metallic arc welded using a flux coated rod supplied by INCO. As K Monel is a new alloy, wide practical experience has not yet been accumulated in welding it, but there appears to be no reason to anticipate unusual difficulties.

Gas welding is not applicable to K Monel.

Grinding, Polishing and Buffing: K Monel takes a high polish. Grinding is done under water or fluid coolant wherever possible as excessive heating affects hardness.

Magnetic Properties

K Monel in all grades is non-magnetic in both the soft and fully hardened condition at temperatures above —40° F. and the permeability is the same as air for magnetizing forces of 10–300 Gilberts per cm. The magnetic transformation point is usually below —110° F.; though hardened K Monel occasionally shows a magnetic transformation point between —40° F. and —110° F.

Literature

Technical bulletin T-9 giving more detailed information on the properties, heat treatment, fabrication and uses of K Monel is available on request. Send for List B showing all bulletins and other literature on Monel Metal and rolled nickel. If interested also in nickel steels, nickel cast iron, nickel bronzes, etc., ask for List A as well.

Copies of this page are available in loose-leaf form. Send for yours.

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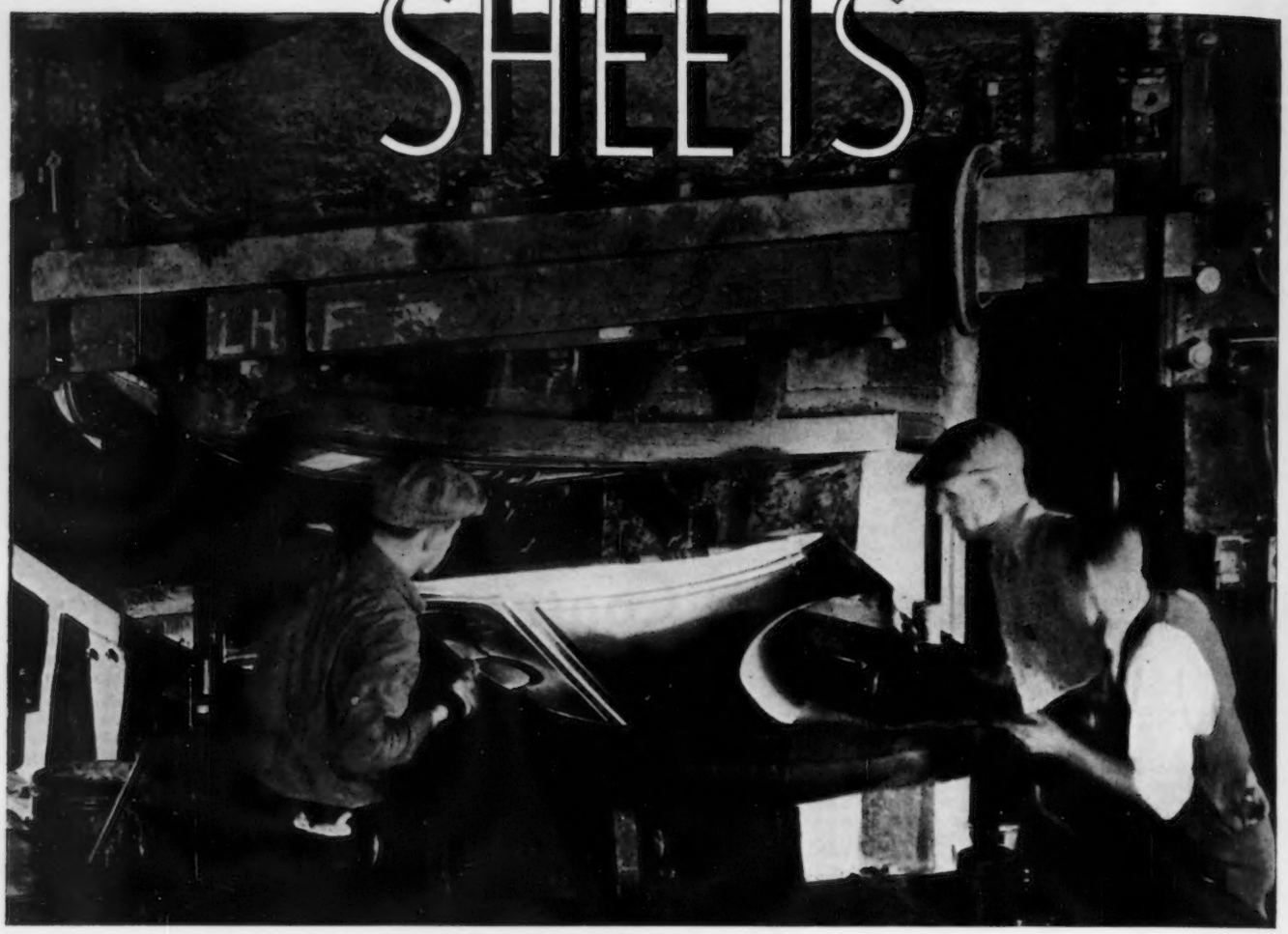

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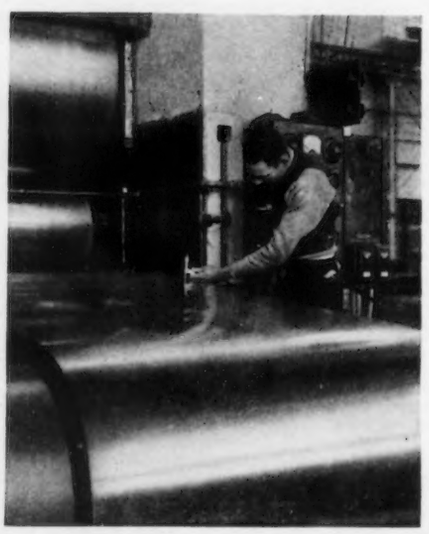

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▲▲▲ THE IRON AGE ▲▲▲

NOVEMBER 19, 1936

ESTABLISHED 1855

Vol. 138, No. 21

I Have Faith in American Employers . . .

ONE of our friends wants an opinion. He writes as follows:

"The overwhelming victory of Mr. Roosevelt in the recent election naturally presents new problems to industrial management or throws added emphasis on existing ones. What phase of managerial responsibilities, in your judgment, will be most affected?"

This is not a hard question to answer. Beyond all doubt, the most important subject for the next year or two at least will be that of employer-employee relations.

It may not be palatable for some of us to face the facts, but like it or not, what we have in the United States today is a labor Government. If you doubt that, look at the shifts in Pennsylvania, Ohio, Illinois, Michigan and Connecticut.

Labor, employed as well as unemployed, reelected Mr. Roosevelt. It reelected him on the expectation that he would do things to benefit labor.

The great mass of American workers evidently believe that Mr. Roosevelt can and will do more for them than their employers could or would do.

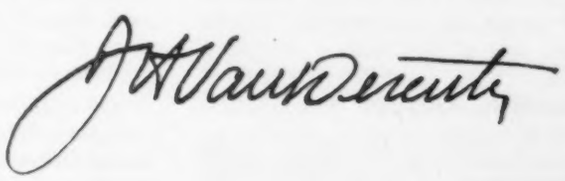
It is this belief, not the facts which may eventually prove it to be right or wrong, that is important and significant to the employer.

It is not now a question of whether the President did a better selling job to labor than did the employers of labor. Nor of whether he promised labor more than its employers felt safe to promise. These questions are beside the point.

The big, important thing for you to think about is this: A great majority of those who earn, depend upon or wish for wages expect the Administration to better their lot. Just suppose that this did not come to pass. Could the employer expect or hope to escape unscathed if it could be shown that he or his kind had been responsible for throwing a monkey wrench in the wheels?

That is why I say that employer-employee relations is the dominant topic for our consideration for some time to come. There must be no opportunity given to any one to say that American employers have done less than all that was humanly possible to better the lot of both our employed and our unemployed.

It is a big job for big men. It means a serious and intelligent self-examination, followed by resolution and action. I, for one, do not think it is too big a job for American employers, for I have faith in them.



THE ECONOMICS OF INDUSTRIAL POWER TRANSMISSION

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

o o o

IN this discussion, and in others to follow, an attempt will be made to clarify the basic principles of power transmission from the economic viewpoint in such language as the non-technical executive may readily grasp. Later, simple descriptions of the functions of all types of power transmission equipment will be given with particular emphasis upon the parts they play when properly used; and finally specific problems of power transmission will be analyzed in various types of manufacturing plants. By means of this approach — through economic principles and functions of equipment to actual application problems, viewed always from the angle of what may be done to eliminate wastes in the use of power — management may consider its specific problems intelligently and be assisted in working out reasonable solutions.

o o o

IT has been variously estimated that the cost of the power required to drive the machines of American industry amounts to one and a half billion dollars a year. This cost, like the cost of materials, equipment and labor, is a basic element of the price a manufacturer must pay to make goods; he cannot escape it. The cost is not uniform in all industries, but may vary from less than 2 per cent to more than 20 per cent of the total cost of manufacturing.

The implications, therefore, of a statement in the opening pages of a booklet* which has had wide circulation among industrial executives during the past four years are startling:

> "Not over three-quarters of the rotary power produced at any given source is used in production in any plant. In a large number of plants, another quarter is unnecessarily wasted."

This statement, which means that faulty power transmission wastes one-quarter to one-half of the power produced for the purpose of driving machinery, has stood unchallenged and undenied. Further, hundreds of capable engineers have admitted its essential truth.

Back of this waste of power, which is an engineering problem, lies an even more serious problem of economics. Actually the proper understanding of the engineering problem is largely dependent upon the clarity with which the underlying economic problem can be stated, grasped and applied to the facts of a particular situation. Too frequently only the obvious engineering facts of a specific drive problem are considered in any plant, and the solutions worked out,

* "A Practical Analysis of Some Fundamentals of Industrial Power Transmission," published by Mechanical Power Engineering Associates.

generally by rule of thumb methods from the experience of some old and trusted employee, do not strike at the real roots of the difficulties.

A practical analysis of the economic facts involved in the transmission of power from a source to a driven machine begins with this fact: All manufacturing power originates in the form of a rotating shaft. The source may be a waterwheel, a steam or internal combustion engine in the industrial plant, or it may be a feed line from a public utility central station operating a motor in the factory. Whatever the source, the power becomes usable when it turns a rotating shaft. Practically all manufacturing loads are carried by some form of power application to rotary shafts on driven machines. It is *between* the rotary shaft that furnishes power and the rotary shaft which utilizes power in the driven machine, that the losses mentioned above occur. There are certain losses under ideal conditions, of course, for friction takes its toll everywhere and slip occurs inevitably, but large savings may be effected by the proper combination of engineering and economic planning.

Of necessity, all types of power generators deliver relatively large blocks of power, and manufacturing loads are for the most part relatively small for each driven machine. The manufacturing problem then is concerned with the economic distribution of large blocks of power over a number of small loads.

The Question of Cost

Into this problem, when viewed from the angle of economics, enters the cost of the invested capital required to provide the transmission system, the cost of operation of that system, the cost of maintaining it, the relations between that system and the costs of production flow, of materials handling, of labor, of safety and of plant lighting; and with all these factors must be considered also the general type of operations for which the plant is responsible, the need or lack of need of providing machine mobility to accommodate change in production from time to time, and the question as to whether the plant operates steadily at full production every day, or is rushed to death at one time and sharply curtailed at another.

It is obvious that all these factors should be considered equally with the engineering problems involved in the actual transfer of power from one rotating shaft to another, if the most effective and economical use is to be made of the power required for manufacturing operations. That they are not so considered in thousands of plants today must be obvious also, if the truth of the statements made regarding power wastes is admitted.

FRANCIS JURASCHEK, who has recently joined the staff of The Iron Age as consulting editor on the subjects of industrial power transmission and materials handling, is well known in both these fields. After eight years of engineering work he transferred his affections to the advertising and sales promotion of industrial equipment, serving on the marketing counselor's staff of McGraw-Hill Publishing Co., organizing the industrial advertising department of the Hanff-Metzger advertising agency, heading the advertising and sales promotion division of The Yale & Towne Manufacturing Co., and becoming President of the Freystadt-Juraschek industrial advertising agency. During the past two years he was manager of the Power Transmission Council and in that capacity has established the most friendly relations with the principal executives among the manufacturers of power transmission equipment and assisted in organizing a world-wide educational effort to promote the economical use of power in industrial plants.

First Principles

Industrial power transmission first became a factor in the general manufacturing problem when the invention of the spinning frame by Arkwright provided the basis for the Industrial Revolution in England. Thereafter, *manufacturing*, or *hand-working* moved from the home to the factory. The work of hands became multiplied enormously by machines, and introduced the basic problem of the use of power. Waterwheels and steam engines were the first sources of that power; from these sources ropes and then belts drove huge, slow-speed jackshafts. In turn, belts drove driving shafts or countershafts to which the machines were finally belted.

Machinery layouts were designed (if indeed that word can properly be applied to the situation) to suit the building, rather than the building designed to suit the machinery. Mill construction became nothing more nor less than box-like structures of from one to half a dozen floors, with side walls and roofs erected for the primary purpose of protecting the machinery and goods in process from the ravages of the weather. Shaft hangers were installed where the exigencies of ceiling or roof beams permitted, without regard to the points of load. Consequently (and also because light alloy steel shafting had not yet been developed) shafting was made heavy, to withstand the considerable bending stresses of drives located many feet away from the nearest hanger. Poor design, heavy equipment, bearings badly proportioned and even more badly lubricated, all united to make frictional losses terrifically large. But power was cheap, no one knew anything better, and output was so far ahead of hand work that these losses could be and were neglected.

Obsolescence, 70 Per Cent

Strange to say, however, almost 70 per cent of the machinery in industrial plants in America is still being driven by a system of power

transmission basically the same as this. Old-fashioned lineshaft methods in these plants differ from the methods used by our great, great grandfathers only in the technological improvements which have been effected in equipment. The system (or lack of system) of operation is the same.

The development of the electric motor was the first break to give rise to real improvements in power transmission. The motor made possible for the first time a *direct* application of power to each machine. In the beginning it was substituted for the source of energy for an entire shop, or a floor, or department thereof. Then a faint glimmering of the idea of grouping machines in somewhat logical units brought a breaking down of the shop or floor or department into operating groups. Finally, with the development of the small motor, individual machines were motorized, either by belt or chain, or through direct coupling or gears.

So many advantages were immediately apparent in individual motor drives as compared with the old-fashioned lineshaft system, that a pronounced swing to this method took place without due consideration of the economic principles involved. Thousands of plants today use the individual motor drive system at a cost out of all proportion to true economy.

Finally men began studying the possibilities of grouping machines in such a way as to secure efficient operation at lowest overall cost, and modern group drive was evolved. This system of power transmission, wherever it can be applied, is both efficient and economical beyond any other method as yet developed; for it is based upon a study of the economic as well as the engineering principles involved in transferring power in large blocks from one rotating shaft to a number of rotating shafts in relatively small blocks.

A Compromise

Modern group drive is essentially a compromise between individual electric motor drive and lineshaft drive. It should be called modern *electrical* group drive, because it is essentially based upon the electric motor as a source of power, with that power delivered through lineshafting to a logical group of machines.

This brief historical sketch is not, of course, complete. It is sufficiently so, however, to indicate the major trends of development, and it is not necessary at this point to go into the details of various types of equipment to understand the fact that development has been (until the past few years) wholly along technological lines rather than economic. Only in the most isolated circumstances has the planning and installation of a drive been made with due consideration of the effect it will have upon the costs of manufacturing, and particularly upon related processes of manufacturing. If a drive met the obvious production requirements, that was all that seemed necessary. And, in a day when production-at-any-price was the order of the day, perhaps there was no need to consider economics *per se*.

Production Costs Important Today

For the past few years many things have occurred to change that "production-at-any-cost" cry. Oftentimes now a possible saving in production costs makes the only profit realizable in a business, what with restricted markets, keener competition and still costly methods of distribution. Power costs are being examined critically, not only at the source, but likewise in the use. With this as a starting point, the transmission of power to driven machines has become a real study.

It had long been assumed that what is now known as "modern group drive" was (wherever it

Problem: 42 heavy duty buffers in one department of a metal working shop now individually motor driven by 20 hp. motors connected by short belts. Motors mounted on machine frames, 2 bearings per drive.

Unit Drive

1. Total installed hp.	840	(As installed, 42 motors × 20 hp. each)
2. Operating hours per year	4,368	(As obtained from management of shop)
3. Average motor load	25%	(Computed, KW input × motor efficiency)
4. Average motor efficiency	78%	(Obtained from motor efficiency curves)
5. Average drive efficiency	73%	(Allowing 5% mechanical losses)
6. Average power factor	.55	(Obtained from power factor curves)

Installation Costs

Motors and controls	$9,198.00	(From motor price book)
Wiring	7,721.00	(From Table of Average Wiring Cost)
Mechanical Drives	1,932.00	(Compiled from equipment catalogs)
	$18,851.00	
Fixed Charges @ 15%	$2,827.00 per year	

Power Computation

840 hp. × 25% average motor load = 210 hp. output of system.
210 hp. output ÷ 78% average motor efficiency = 269 hp. input to system.
269 hp. × 746 (hp. per kw.) = 200 kw.
200 kw. × 4,368 hrs. operation per year = 873,600 kw. hrs. per year.
873,600 × .01 per kw. hr. (cost to management of shop) = $8,736.00 pr. yr.
Power factor penalty (or fixed charges on power factor corrective equipment due to operation below 85% p.f. . . 450.00 pr. yr.
Total annual power cost . . $9,186.00

Operating Cost Computation

Fixed Charges	$2,827.00
Power Charges	9,186.00
Maintenance Charges:	
42 motors	
42 controls	
42 drives	
84 bearings	
(On basis of $10 per drive)	420.00
Annual Cost	$12,433.00

Modern Group Drive

Problem: Same 42 heavy duty buffers, assumed to be divided into 8 groups, utilizing normal load factors and consequent high efficiency of motors. Each group will require one 30 hp. motor connected by belt to overhead shafting and thence by belts to the machines. Shafts, 30 ft. long, 2 3/16 in. diam. 9 anti-friction bearings per drive.

1. Total installed hp.	240	(Unit motor Drive hp. × aver. motor load)
2. Operating hours per year	4,368	(As before)
3. Average motor load	88%	(From effic. curves and normal ld. factor)
4. Average motor efficiency	91%	(From motor efficiency curves)
5. Average drive efficiency	86%	(Allowing 5% for mechanical losses)
6. Average power factor	90%	(From power factor curves)

Installation Costs

Motors and controls	$2,394.00
Wiring	1,707.00
Drives	3,800.00
	$7,901.00
Fixed Charges @ 15%	$1,185.00 per year

Power Computation

873,600 kw. hrs. × 73% (average unit drive efficiency) = 637,728 kw. hrs. actually consumed by machines operating for one year.

637,728 kw. hrs. ÷ 86% (average modern group drive efficiency) = 741,500 kw. hrs. required by modern group drive system.

741,500 kw. hrs. × .01 =	$7,415.00 pr. yr.
Power factor charges—none	
Total annual power cost	$7,415.00

Operating Cost Computation

Fixed Charges	$1,185.00
Power Charges	7,415.00
Maintenance Charges:	
8 motors	
8 controls	
50 drives	
90 bearings	
(On basis of $5.00 pr. drive)	250.00
Annual Cost	$8,850.00
Comparison: Annual Cost of Unit Drive system	$12,433.00
Annual Cost M. G. D. system	8,850.00
Saving due to M. G. D. system	$3,583.00

could be effectively applied) less costly than old-fashioned lineshaft drive, or than individual motor drive. Actually, however, few could substantiate that assumption with definite figures. Within the past four years this has begun to be remedied by certain research work carried out in typical American industrial plants by the case study method. Since this research work has embraced both economic and engineering principles, the results have been extremely interesting, and provide the bases for definite conclusions.

For practically the first time, comparable figures were deduced in various industries on the actual costs of delivering power to machines. Also, this research work established the fact that costs of installation, operation and maintenance were not the only figures to be considered; that side by side with them must be considered other factual data such as production flow, materials handling, production capacity used at any particular time, personnel of the machine attendants, and many other related things.

These considerations really begin with the character of the shop. What may be highly desirable as a transmission system in a flour mill may be vitally wrong for a machine shop; what is good in a cotton weave shed may be bad in a paper making plant; and it is never safe to think that because Ford or General Motors finds one way of doing things highly profitable the same thing will yield similar profits in a soap or varnish plant. Where a standardized product is made continuously the drive conditions are apt to be entirely different than where different products are worked on each day or each month. Robert Drake prefers to classify industrial plants from the transmission viewpoint in three categories:

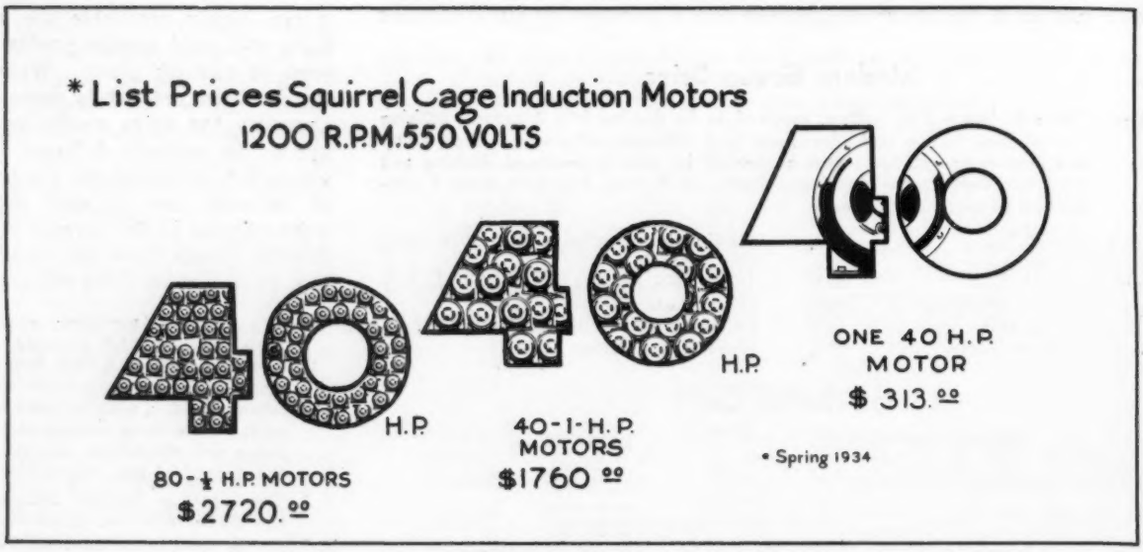
1. The typical American manufacturing plant, which averages over a ten-year period a little less than single shift operation at maximum capacity, with a large night shift in the busy season of boom years and short-time operation in the depths of the depressions.
2. The "feast or famine" industry—the plant in which some departments work night and day while other departments have nothing to do, and which shuts down almost entirely in a depression year or in the dull season.
3. The plant that averages two shifts, except for single shift operation in a dull season of three or four months' duration.

Shop equipment is laid out today to facilitate a continuous flow of processing operations *and* to eliminate unnecessary re-handling of materials. This is a first economic consideration. So important is it that buildings are planned to accommodate these factors rather than these factors being forced into the layout of a building.

But coincidentally with such layout of equipment should go a study of the transmission problems involved in driving the equipment. Often a more economical system of transmission drive will dictate some rearrangement of equipment. For instance, even when individual motors are used on every machine the question of wiring distribution and location of controls will affect the placement of certain machines. Wiring distribution must therefore be considered as an essential element of the transmission system, equally with moving electrical or mechanical equipment, since it enters into the economic study of operation.

The Least Possible Ultimate Cost

In any investigation of the economics of power transmission the one prime object must be to discover how to deliver the necessary power to the point of use at the lowest possible ultimate cost. There are, of course, many cases in which certain types of machines *must* be driven directly. A rolling mill, for instance, definitely falls into this



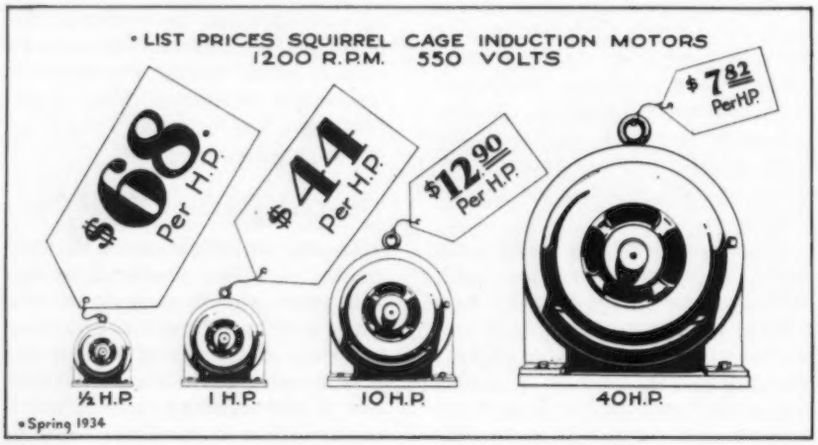
COST of motor horsepower in large and small packages.

category — and special machines such as are used in the automotive industry for the simultaneous or progressive machining of identical parts. And a small machine may differ so much in its load and operating characteristics (such as the need for widely varying speeds) from a number of other machines that it cannot logically be fitted into a *system* of drives. However, the great mass of industrial machinery can still be classed as equipment requiring relatively small blocks of power, and located in plants containing many similar or allied types of machine loads. For all these cases, a system of industrial power transmission should be considered which will utilize to the best advantage the sum total of power required to drive the machines. Outside of this system, and to be treated separately, are just two general classifications of machines; those of such peculiar characteristics of load and operation as cannot be included with others, and machines requiring a high power demand, out of proportion to the demand of other machines around them.

But, as "systems" of power transmission in the industrial plant, we have only three propositions to consider: old-fashioned lineshaft drive, individual motor drive, and modern group drive. Since old-fashioned lineshaft drive has been proved to be inefficient and costly, and since no competent engineer will today recommend its further use in view of the unquestioned economies which may be effected by the use of either of the two modern systems, old-fashioned lineshaft transmission will be ruled out of the discussion at once.

Individual motor drive as applied to equipment not of the special purpose type or to the high power demand type above mentioned, is widely favored today for many reasons other than economic. It combines improved appearance and a high degree of safety with unsurpassed machine mobility and an absence of overhead construction in the plant. Most of these are to be had in this system only at the expense of increased operating cost.

Modern electrical group drive combines the best economic advantages of the electrical and mechanical transmission systems, producing lower net production costs *wherever it can be logically used.* This system is not a panacea. It contains many faults and is not applicable to all industrial situations. Where it has been properly designed and installed, however, the resultant economies amply justify it as the most important forward step in power transmission since the development of the commercial size motors.



THE larger the motor, the less the per horsepower cost.

The Distribution of Power

In considering these two systems of power transmission, it is essential to remember the fundamental difference encountered in the distribution of the relatively small blocks of power required for each machine, from the source of energy available at the plant. In the individual motor drive system, a number of machines, with varying loads and varying periods of operation are fed by electric energy distributed to each machine-motor. The motor horsepower provided must be the sum of the starting loads, or the maximum operating loads

(whichever is the greater) of all the motors collectively. Since this sum, or the "electrical demand" is always greater than the sum of the normal running loads of the machines, the load factor of operation is low. The system must of necessity be "over-motored"—and motor horsepower costs money.

When these same machines are provided with interconnected mechanical drives operated from one motor, the horsepower of that motor need be only the sum of the normal running loads of all the machines collectively, since the machines may be started in sequence instead of all together, and peak loads will stagger themselves automatically throughout the cycles of operation of the machines. Load factor of operation is consequently high, and less installed motor horsepower is required in the modern electrical group system.

It is thus seen that the real question involved in designing a system of power transmission for an industrial plant today comes down to this: How many machines shall be driven from one motor? That question is dependent on the relation between the economics of power transmission and the problems of production flow and material handling in the plant under consideration. Let us first analyze the economic factors in the two systems, leaving for later discussion the problems of production flow and material handling.

Since, however, the electric motor is the heart of both systems, it will be of interest to look briefly at motor costs in small and large packages. The diagrams on opposite page indicate that the cost of one 40 hp. motor of the squirrel cage, induction type is about one-ninth the cost of 40 hp. in ½ hp. motors. Or, to put it in a different way, the single 40 hp. motor costs $7.82 per hp., while the 80 half-hp. motors run the cost per hp. to $68. This accounts for motor costs alone. When it is considered that, because of low load factor of operation a greater installed motor horsepower is required to drive the same number of machines with individual motor drive, and the additional wiring and control cost either balances or outweighs the added cost of mechanical drive equipment in the group drive system, a large part of the greater cost of the individual motor drive system is explained.

SEVENTY per cent of the machines of American industry are still driven in this fashion. Between 8 and 10 per cent of the total manufacturing cost can be saved here by a complete revamping of power transmission methods.

What Are the Costs of Driving Machines?

In the study of transmission costs it is necessary first to evaluate

(CONTINUED ON PAGE 114)

INDUSTRIAL APPRENTICESHIP, 1936 MODEL

A PROGRAM of training to fit young men for key positions in its plant and which differs in some particulars from the usual apprentice training course was placed in operation a few weeks ago by Thompson Products, Inc., Cleveland. An intensive and broad training course covering a four-year period is provided, important features of which include the limiting of the course to a small, carefully selected list of students and the entering into a contract between the company and the applicant for enrollment and his parent or guardian, under which the apprentice agrees to continue his course of training through the four-year period.

Apprentice training programs were largely abandoned during depression years and recently manufacturers with the shortage of skilled labor that is already in evidence have come to realize that the demands of industry call for revival of methods of training boys to become skilled mechanics. The training program adopted might be called a new model to meet 1936 conditions.

The Thompson training course is designated as the Thompson industrial training program instead of being given the usual appellation of an apprentice training course. The manufacture of automobile and air valves, the Thompson products, is a highly specialized industry that is carried on by the Thompson company in a high production plant. The training program adopted is designed to give the students a training in the company's method of carrying on its activities and to meet its particular manufacturing problems. Starting a boy at the bottom and giving him the proper training to grow up in the organization in the opinion of the management is preferable to taking men who have had training elsewhere and must be retrained to fit into the company's methods.

By F. L. PRENTISS

Cleveland Editor, The Iron Age

A Four-Year Course

Each student under the plan is to be given a practical knowledge of the machinist's trade and also executive training. The students, it is expected, will qualify at least for tool room work at the completion of the course and some will be capable of being developed into supervisors. While the company has not yet experienced a shortage of skilled help, it felt that it would suffer a shortage in the future unless it adopted a plan of apprentice training.

The training course as set up comprises approximately 10,000

hours of instruction over the four-year period. Of this 9200 hours will be devoted to shop work and 800 hours to class work. The pay rate is 20 cents per hr. for the first year, 30 cents per hr. the second year, 40 cents per hr. the third year, and 50 cents per hr. the fourth year.

CONSOLIDATED INSTRUCTION RECORD

INDUSTRIAL TRAINING PROGRAM
THOMPSON PRODUCTS, INC.

Name Steve Treer — Instruction Started April 1, 1936

Date	Shop Work	Grade	Class Work	Grade
5/4/36	Dept 12 - Drill Press	B	Drafting	C
6/1/36	Dept 3 - Drill Press	B	Drafting	C+
7/6/36	Dept 30 - Milling Machine	C	Drafting	C+
8/3/36	Dept 3 - Milling Machine	B	Drafting	B
9/7/36	Dept 15 - Rough'g Screw Machine	C	Drafting	B

The students are distributed throughout the plant, being placed alongside of regular employees in the charge of the foremen in the respective departments, who give them instructions on the operation of machines and they engage in production work as rapidly as they gain sufficient training on the particular machine, although, of course, they are not expected to develop much speed at the start. Under this plan responsibility for seeing that the apprentice receives the proper kind of training rests to a large extent upon the foreman. The entire supervisory organization is expected to do its utmost in training the students.

The regular work schedule in the plant is 8 hours per day, five days a week. Part of the classroom instruction is given from 1 to 5 o'clock Friday afternoon during time for which the students are paid, and part on Saturday morning, during their own time. While working in the various departments the apprentices are required to observe the same regulations that apply to regular employees.

The curriculum, which is subject to revision, is as follows:

FIRST YEAR

Technical Trades

2 Mo. Service Shipping
2 Mo. Drill Press
2 Mo. Milling Machines
2 Mo. Engine Lathe
3 Mo. Screw Machine—Elementary
1 Mo. Screw Machine—Advanced

Class Work

100 Hrs. Mechanical Drawing
100 Hrs. Machine Shop Practices

SECOND YEAR

Technical Trades

2 Mo. Screw Machine—Advanced
3 Mo. Cylinder Grinding
6 Mo. Centerless Grinding
(a) Plunge cut
(b) Pass through
1 Mo. Miscellaneous

Class Work

100 Hrs. Tool and Machine Design
50 Hrs. Metallurgy
50 Hrs. Chemistry

THIRD YEAR

Technical Trades

3 Mo. Automatic Screw Machines
3 Mo. Forging Practice
3 Mo. Heat Treatment
3 Mo. Inspection

Class Work

50 Hrs. Factory Accounting
50 Hrs. Factory Management
50 Hrs. Metallurgy Laboratory
50 Hrs. Chemical Laboratory

FOURTH YEAR

Technical Trades

6 Mo. Toolmaking
6 Mo. Machine Repair—machine work general

Class Work

50 Hrs. Business Administration
50 Hrs. Time Study
100 Hrs. Lectures on varied subjects, including Products, Marketing, Finance and visiting other manufacturing plants.

The recently started training class was limited to twelve members. Only graduates of a technical high school are admitted to the course and they must have

(CONTINUED ON PAGE 74)

Form 788

QUARTERLY APPRENTICE REPORT
Industrial Training Program
Thompson Products, Inc.

Name Steve Treer — Quarter Ending 8/1/36

A - Excellent B - Good C - Average D - Poor E - Deficient

	Interest	Aptitude	Proficiency	Conduct	Days Absent	Times Tardy
Shop Work						
Dept 30 - Drill Press	A	B	C+	A	0	0
Class Work						
Drafting	C	C	C	A	0	0
Machine Shop Practice	A	C	C	A	0	0

Remarks:

Steve Treer
PARENTS SIGNATURE

R. S. Livingstone
PERSONNEL DIRECTOR

A MONUMENT *to* CAST IRON

o o o

By LE ROY W. ALLISON

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o o o

HOW many people know that the dome of our National Capitol is made of cast iron?

o o o

AS a tribute to the stability, endurance, artistic accomplishments and decided economy of cast iron, the great dome of the United States Capitol building at Washington presents an all-time and outstanding monument. Frequently referred to as one of the finest, if not the finest specimen of architecture of its character in the world, it is rather surprising how few persons realize or have taken occasion to learn the exact structural nature of this notable dome and the historical significance of some of its features.

That it is formed of iron castings seems generally to be an item of engineering information today, notwithstanding the fact that the structure was built over 70 years ago. It is interesting to note that despite the emphasis given to numerous other standard and special structural materials for Government buildings of varied kinds in recent years and the natural centering of attention on these later and more modern structures, nothing has been developed in this direction to eclipse the pre-eminent position and prominence of the Capitol dome in the Federal city.

Situated on Capitol Hill, practically in the center of Washington, this masterpiece of cast iron construction physically dominates every approach to the nation's Capitol in most imposing manner. Through superior workmanship in mold production, the use of iron castings of highest basic quality, and finally, in skilled performance in erection, the distinctive and stately architecture of this structure is brought out in remarkable detail—rigid, permanent and there to stay. The Capitol dome presents a striking example of the value and utility of this material for structural purposes three-quarters of a century ago, towering today in the same state of preservation and stability as when constructed.

Two domes have figured in the history of the Capitol building, the

"low dome" of the rebuilt Capitol, following the fire of 1814, to which brief reference will be made later, and the present structure. Erection of the latter began in 1856, near the conclusion of the term of President Franklin Pierce, and was completed finally in 1865, nine years later, about the time the Civil War came to a close during the administration of President Abraham Lincoln. According to official records, the columns, ribs, plates and other cast iron members used in the construction, including cast iron ornaments, totaled 8,878,743 lb., or approximately 4500 tons. The material was cast and furnished by Jones, Beebe & Co., New York, prominent in the iron industry of that day.

Made With Two Shells

The dome proper consists of two massive iron shells, an outer and inner shell, respectively, formed by the cast iron plates. In the upper section of the unit, these are supported by 36 heavy cast iron rib sections of semi-ellipsoidal shape, comprising the skeleton framework of the structure. These ribs above the outer colonnade, rest directly over and bear on the circular cast iron footing provided at the base of this level of the dome. The extreme height of the dome above the base line of the east front of the Capitol building to the end of the cast iron construction, omitting the statue on top, is 267 ft. 11 in., while the height from the top of the balustrade of the building to the same point noted is 198 ft. 5 in. At its widest level, the base of the dome has a diameter of 135 ft. 5 in.

There are 36 cast iron columns spaced at equal intervals around the lower portion of the exterior of the dome, these representing the 36 States of the Union at the time of erection. The 36 cast iron ribs, noted above, it may be stated, convey the same significance. Three rows of windows are arranged in the structure at three different levels, uniformly spaced, each directly above the window below, starting at the first level. These windows are graduated in size, both width and height, the smallest being in the upper section of the dome. Each row consists of exactly 36 windows, similarly for the 36 States then forming the Union. Thus the dome receives light through 108 windows, but only one row of these, the lower, shows through both of the cast iron shells into the rotunda.

Symbolizing the Thirteen Colonies

The design of the extreme top portion of the dome, generally referred to as the lantern, and known in Greek architecture as the Tholus, is emblematic of the 13 colonies which became the 13 original States; there are 13 cast iron columns in the unit encircling the lantern, while the latter, in turn, has 13 windows, conveying this significance. According to established custom, the lantern is illuminated whenever Congress is in night session.

The top of the dome is surmounted with the famous bronze Statue of Freedom, the work of Thomas Crawford, a well-known sculptor of that day, residing at Rome, Italy, where the figure was modeled. The plaster mold was sent to the United States and the bronze cast at the foundry of Clark Mills, then located on the Bladensburg Road, near Washington. The statue is 19 ft. 6 in. high, thus giving a total height to the tip of the dome of 287 ft. 5 in., above the base line of the east front of the building, previously referred to. The bronze statue weighs 14,985 lb.

The exterior iron shell at the top of the dome is provided with a series of openings to admit additional daylight; at the aperatures the rays are deflected by reflectors so arranged that the light falls in an effective way on the inside of the canopy forming the interior of the dome, illuminating the top of the canopy with its noted fresco panel depicting Force and Progress, painted by Burmidi. At night, artificial light is used from 425 outlets encircling the base of the canopy, giving hightly artistic illumination to this part of the dome.

A stairway between the outer and inner cast iron shells leads from the base of the dome to the lantern at top. This stairway, starting at the office of the Architect of the Capitol, located in the building, is formed of exactly 365 steps, one for each day of the year. Just beneath the base of the canopy, a railed gallery traverses the

(CONTINUED ON PAGE 122)

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THIS is probably the first photograph ever made of the U. S. Capitol, back in the early 60's when photography was in its infancy. The Tiber River, shown in the foreground was later to be filled in and become part of Pennsylvania Avenue.

Photo Courtesy U. S. Army Signal Corps.

HOW ARC WELDING CUTS COSTS OF JIGS AND FIXTURES

Part II.— Typical Tooling Savings

By A. F. DAVIS

Vice-President, Lincoln Electric Co., Cleveland

MANY production plants have reduced tooling costs up to 50 per cent by adopting arc welding. Savings are made in materials, in reduced labor and in lowered production time.

The labor and time savings with welding come from the simplicity of the electric arc's application. Given the design for a certain jig or fixture, the toolroom merely cuts up standard mill shapes and welds them together.

Typical Tooling Cost Savings

	Cost Saved by Welding
Drill jig	29 per cent
Welding fixture	40 per cent
Die shoe	50 per cent
Milling fixture	12 per cent
Machining fixture ..	43 per cent
Boring fixture	16 per cent
Assembling fixture..	40 per cent
Welding fixture	38 per cent
Fixture built of scrap metal	60 per cent

The accompanying illustrations show a number of typical welded steel jigs and fixtures. Each unit shown has resulted in definite savings to the maker.

The welded steel drill jig pictured in Fig. 2 is used for drilling seven holes from three directions in the work shown at the right in the illustration. Note in particular the overhang of the legs. This is possible without danger of fracture because steel has ample impact strength. The lugs of the jig are strong, yet of very light construction, welded in their proper locations. In welded construction, cross-sectional design is of no concern beyond the usage of the jig.

Since arc welding permits reduction of sections and elimination of much of the reinforcing of overhanging parts, the jig becomes lighter and smaller. This con-

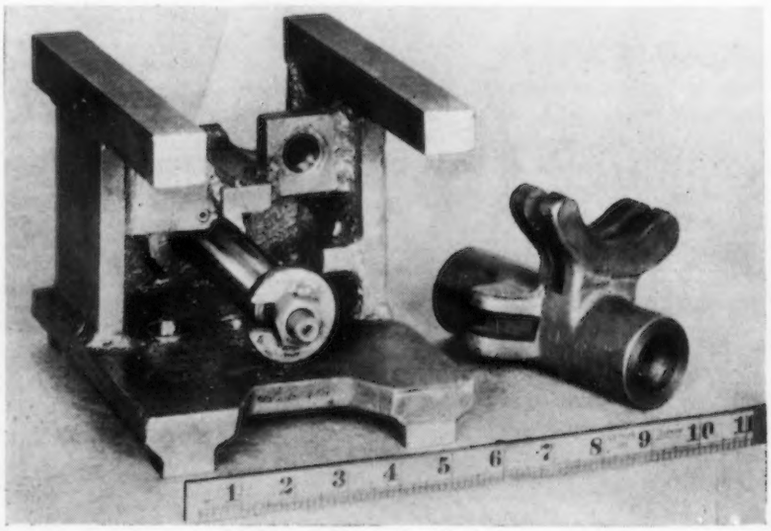
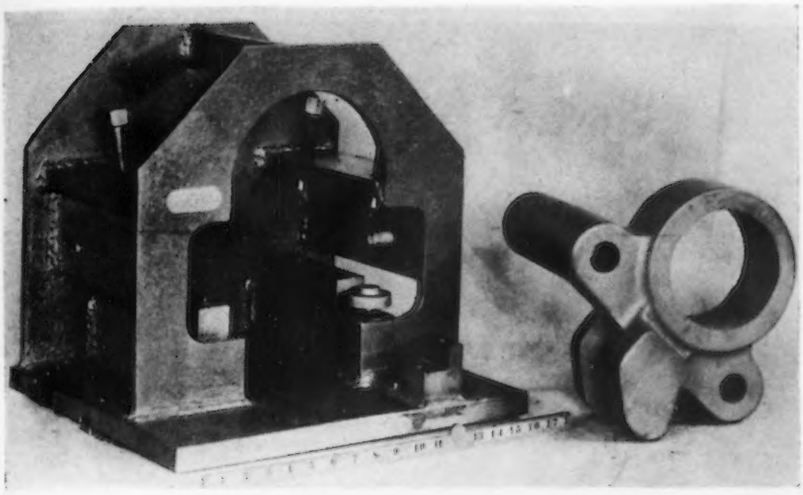


FIG. 2—Welded steel drill jig for drilling seven holes from three directions.



ABOVE

FIG. 3—Boring and back-facing fixture of open construction.

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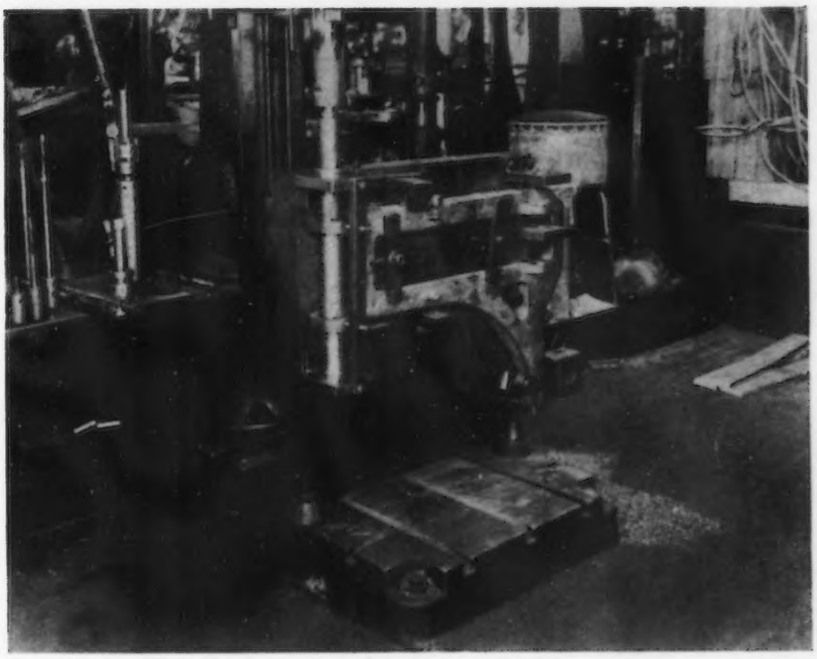


AT LEFT

FIG. 4—Arc welded jig for fast machining of woodworking machine arbors.

Photo courtesy Jones Superior Machine Co.

o o o

BELOW

FIG. 5—Milling fixture for face of gear box.

ed fixture allows the operator to conveniently insert the back facing cutter and also observe and measure the cut.

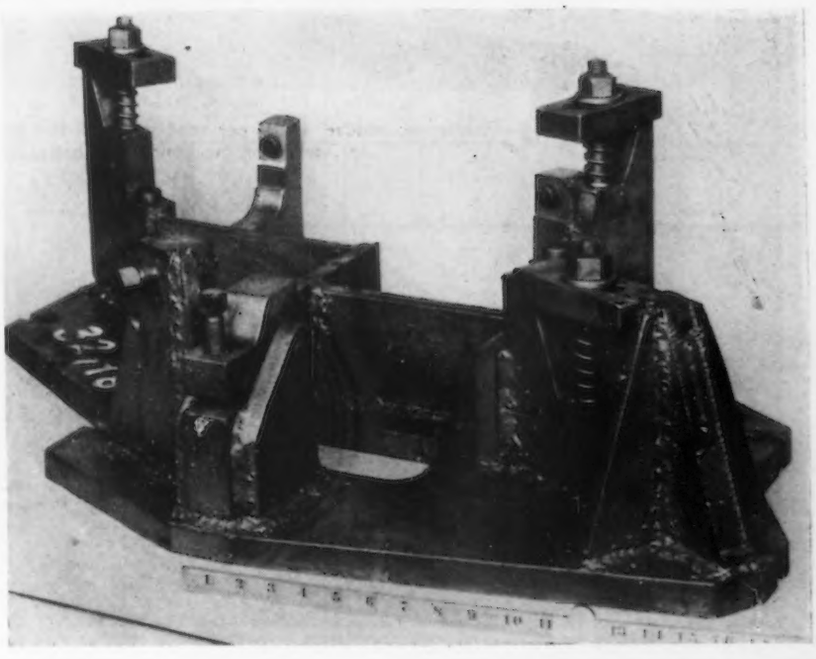
Time and money were saved by weld fabrication of the jig pictured in Fig. 4. This jig is built entirely of steel and is used for machining the arbors of woodworking machines. It consists of heavy plate to which guides are accurately arc welded.

Fig. 5 shows a milling fixture for face of gear box. Here is a fixture design which, in spite of its simplicity, by actual record costs 12 per cent less by arc welding. Its cost serves valuable productive energy and contributes largely to the lower costs provided by welding. Following is a statement of the cost of the arc welded drill jig.

Burning and welding	4 hr. at $1.75	$7.00
Machining	15 hr. at $1.75	26.25
Weight	22 lb. at 0.035	.77
		$34.02

Savings by arc welding—29 per cent.

The boring and back-facing fixture in Fig. 3 is used with a bar feed head. The work performed in the fixture consists of drilling the holes shown in the part at the right and facing the 7-in. diameter boss. The fixture shown was built by welding at a cost of $86.81, which is 16 per cent less than it would have cost otherwise. The open construction of this arc welded



was only $98.88. Of this, $17.50 was for burning and welding, $71.75 for machining and $9.63 for metal. In addition, arc welding provided a strong, rigid fixture, and an open construction that eliminates chip pockets and makes cleaning easy.

The two long fixtures illustrated in Fig. 6 represent a saving of $28. They were built by arc welding for $12. The fixture in the center of the photo is used for cutting keyways in shafts. Material cost was $3, and labor cost, $2—a total of $5.

Fig. 7 shows a welded jig that can be readily rotated for the work. Jigs of this type may be quickly and economically produced by arc welding. The particular jig here pictured is for machining a goose-neck on a 20-in. and a 15-in. band saw.

(TO BE CONTINUED)

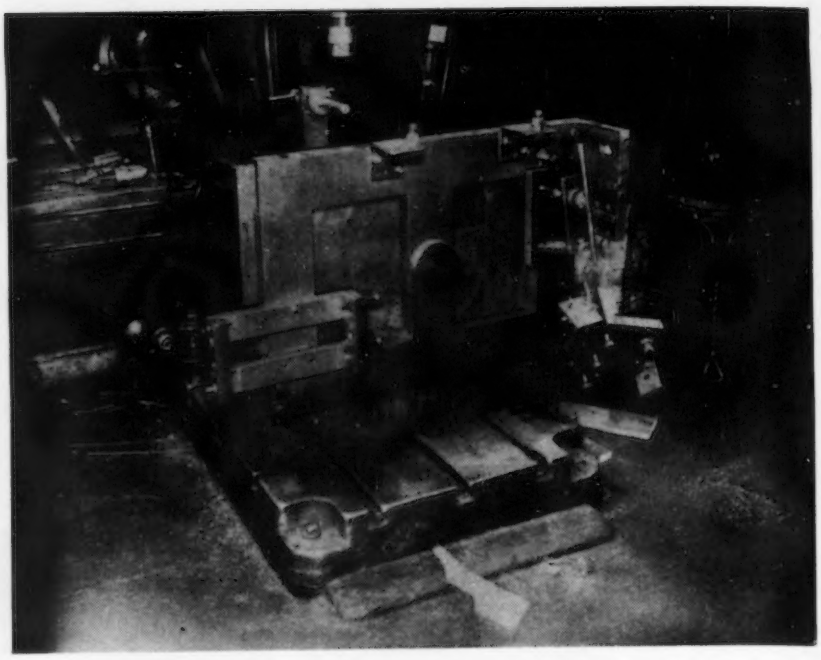


FIG. 7—Jig for machining a goose-neck on a band saw.

Photo courtesy Jones Superior Machine Co.

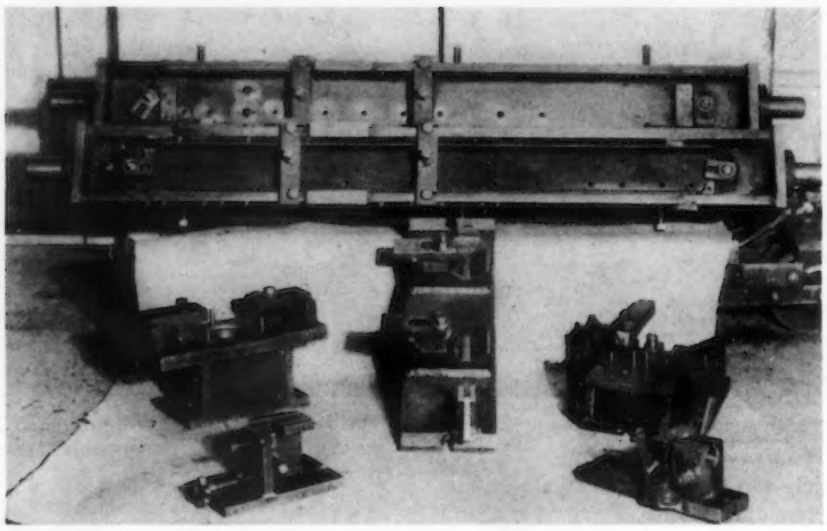


FIG. 6—Fixture arc welded at 75 per cent savings. The fixture at the center is for use in cutting keyways in shafts.

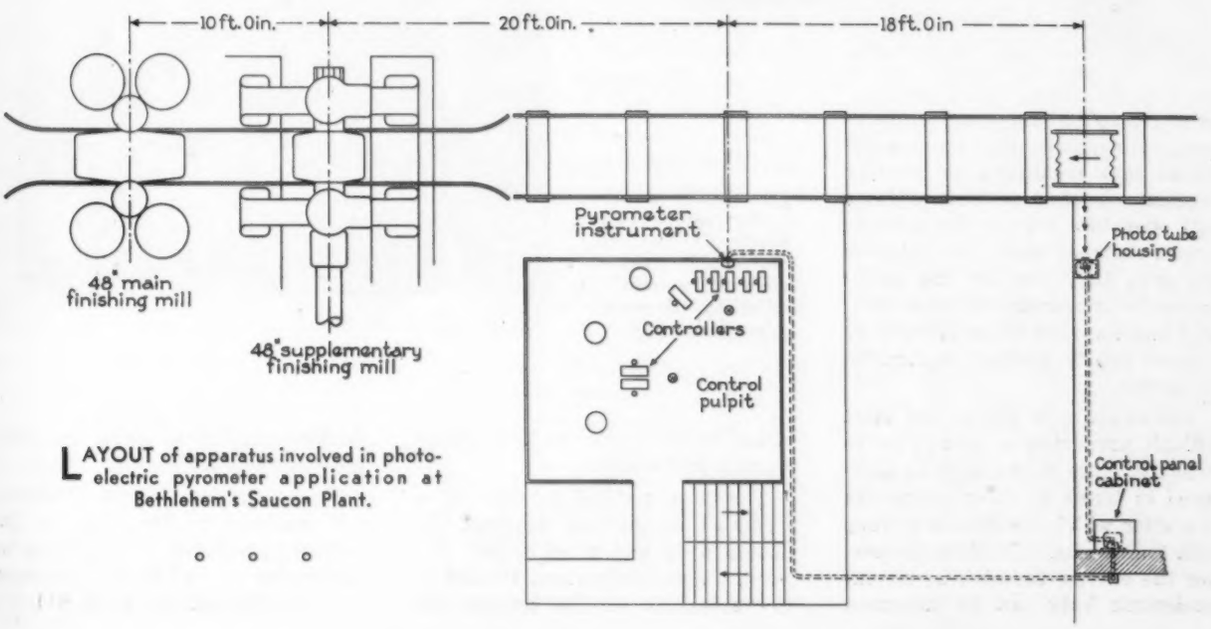
APPLICATION of PHOTOELECTRIC PYROMETER to BETHLEHEM SHAPE MILLS

By A. J. STANDING

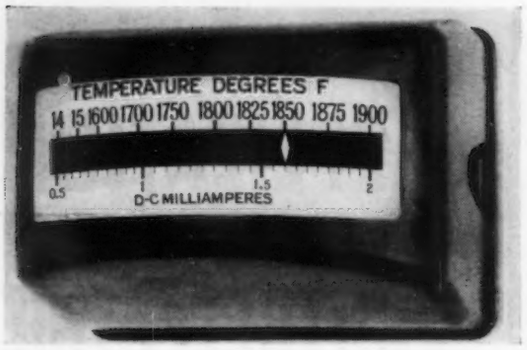
Superintendent Electrical Department, Bethlehem Steel Co., Bethlehem, Pa.

TO provide accurate and constant visual indication of the temperature of the bars being rolled, a photoelectric pyrometer was recently applied to a 48-in. shape mill in the Saucon Plant of the Bethlehem Steel Co. in such a way as to obviate the interference caused either by scale on the bars or by steam and water vapor surrounding them. The equipment has given successful operating results and, because of the precise knowledge now available at all times to the mill operators, it has contributed to an improvement in mill yield by making duplication of sections easier to attain.

The problem confronted in this case, as it is in all mills, was that of producing as nearly perfect a section as possible. A major aid in the solution of this problem is, of course, an accurate and constantly available indication of the temper-



LAYOUT of apparatus involved in photoelectric pyrometer application at Bethlehem's Saucon Plant.



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AT LEFT

INDICATING ammeter calibrated in deg. F. of the heated body.

with possible errors involved in repeated settings for each reading.

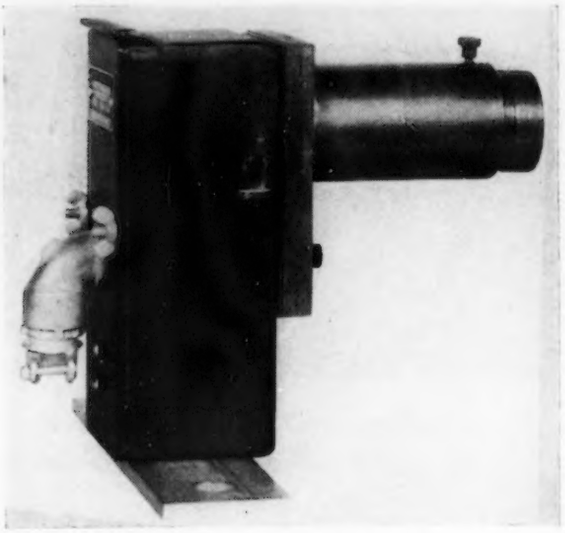
The photoelectric pyrometer is essentially free from variation and human error in its results for a given set of conditions and has the additional advantage of giving a

ature of the steel being rolled in order that the most suitable setting of the mill may be made for each rolling of a given product. In connection with mills rolling special structural shapes, this problem must be met in the case of each individual bar. The problem is further complicated when two bars are rolled from one ingot without reheating, for then the bars do not

o o o

BELOW

PHOTOTUBE holder disassembled to show construction.



DUST-TIGHT cast iron phototube holder with light tunnel and adjustable aperture.

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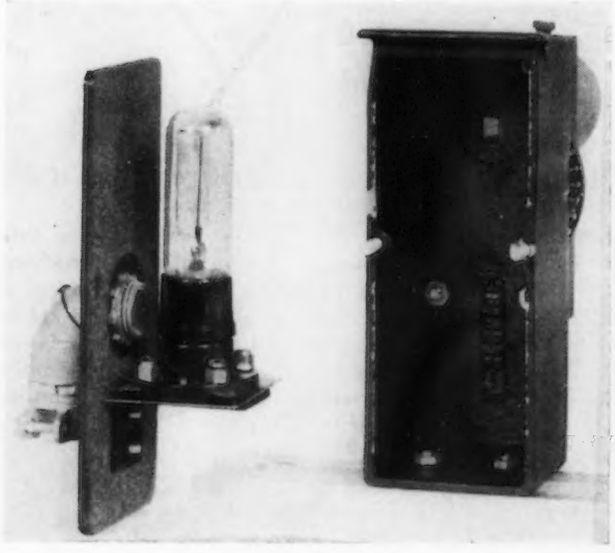
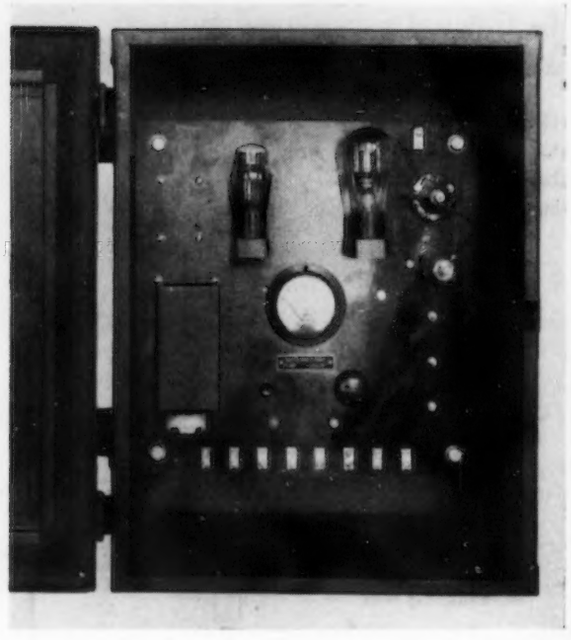




enter the mill at the same temperature; consequently they require different mill treatment to produce duplicate finished sections. If the mill operators know the relative temperature of each bar entering the mill, they can set the mill screws to compensate for this variable and improve the mill yield by a more nearly perfect duplication of section.

AT RIGHT

PLIOTRON amplifier panel which boosts output of phototube to a value sufficient to actuate indicating instrument in roller's pulpit.

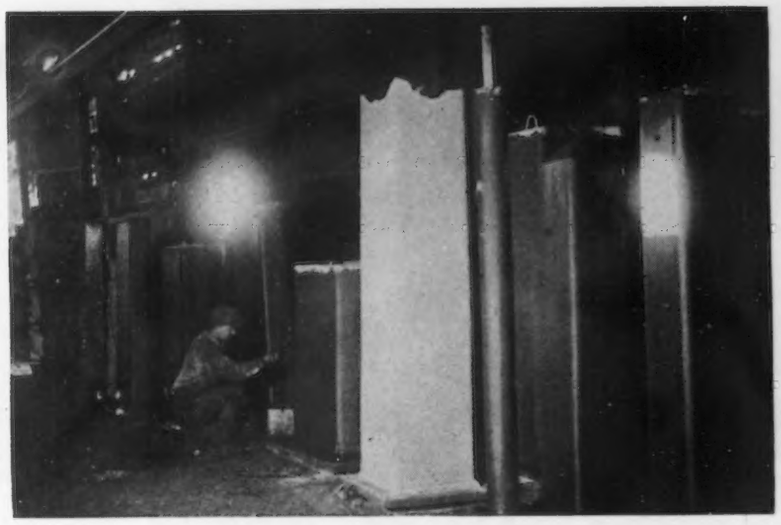
Temperature is one of the most difficult properties of matter to measure, since it can only be measured in terms of other properties of matter which are known to vary with temperature. Of these properties the energy radiated by an incandescent body can be measured either by an optical or by a photoelectric pyrometer.

The first method consists of a visual comparison between the heated body and a calibrated filament. This comparison is subject to variations of the human eye

The operation of the photoelectric pyrometer, like that of the optical pyrometer, is subject to interference caused by the presence

(CONTINUED ON PAGE 61)

Cement-Bonded Sand Used by Mold Maker



BETTER quality ingot molds resulting from a better control of casting variables has followed the installation of the Randupson process of cement-bonded sand molding at the Vulcan Mold & Iron Co., Latrobe, Pa. This company has an exclusive license for the manufacture of tool steel and other special molds from the Birdsboro Steel Foundry & Machine Co., which is the American agent of the French company, Societe d'Electro-Chemie d'Electro-Metallurgie et des Acieres Electriques d'Ugine.

About July 15, 1936, Vulcan began the production of ingot molds by the Randupson process. The essentials of this process consist of a molding sand mixture composed of silica sand (about 98 per cent pure), "high early strength" portland cement, and water. The ramming of the mold may be done in any one of the usual ways; by hand, pneumatic rammers, or on molding machines. After ramming, the mold is air dried naturally for a period of time varying from 24 hr. to 72 hr. previous to casting. The illustration above shows finished cores used to form the ingot cavity of molds. After drying, a coating is applied by brush, as shown here by the men in the foreground. Patterns of the usual type are used for solid molds. For split or two-piece molds and other similar castings, the molding is done largely in cores with a frame to form the outside of the mold. The use of flasks is largely eliminated since the sand mold sets up hard and strong enough to permit the clamping of the mold itself.

Following the introduction of the Randupson process, Vulcan installed various types of machinery to limit to a minimum human variables in the manufacture of ingot molds. In order to insure proper and homogeneous mixing, a Clearfield mixer was installed to take care of the sand, cement and water composition. A Jeffrey conveying system is used for handling the sand and to fill the molding boxes. In order to eliminate the defects possible through hand or pneumatic ramming, the company installed two Hermann jolt machines, which assure a consistent and satisfactory practice. Another important part of the machinery set-up is the Jeffrey pulverizer and the Pangborn dust collector, both of which are used in reconditioning the old sand, which is used again as part of a new mixture. Recovery of sand is extremely high.

A simple description of the manufacture of an ingot mold will bring out the inherent differences and results between the new Randupson method of manufacture and the old method. After the proper amounts of sand and cement are conveyed to the mixer, the correct proportion of water is added, and the desired mix is automatically completed. This mixture is then conveyed to storage bins and molding boxes by belt and bucket conveyors.

The ingot cavity of the mold is made by a core of the sand mixture rammed in wood and metal core boxes on a jolt machine. Metal core bars or arbors previously used are eliminated. This latter feature is very important for many reasons, among which are, first, the elimination of a large metal equipment inventory, and, second, the consistency in the amount of sand rammed which, with varying sizes of molds and core bar equipment, was not previously possible.

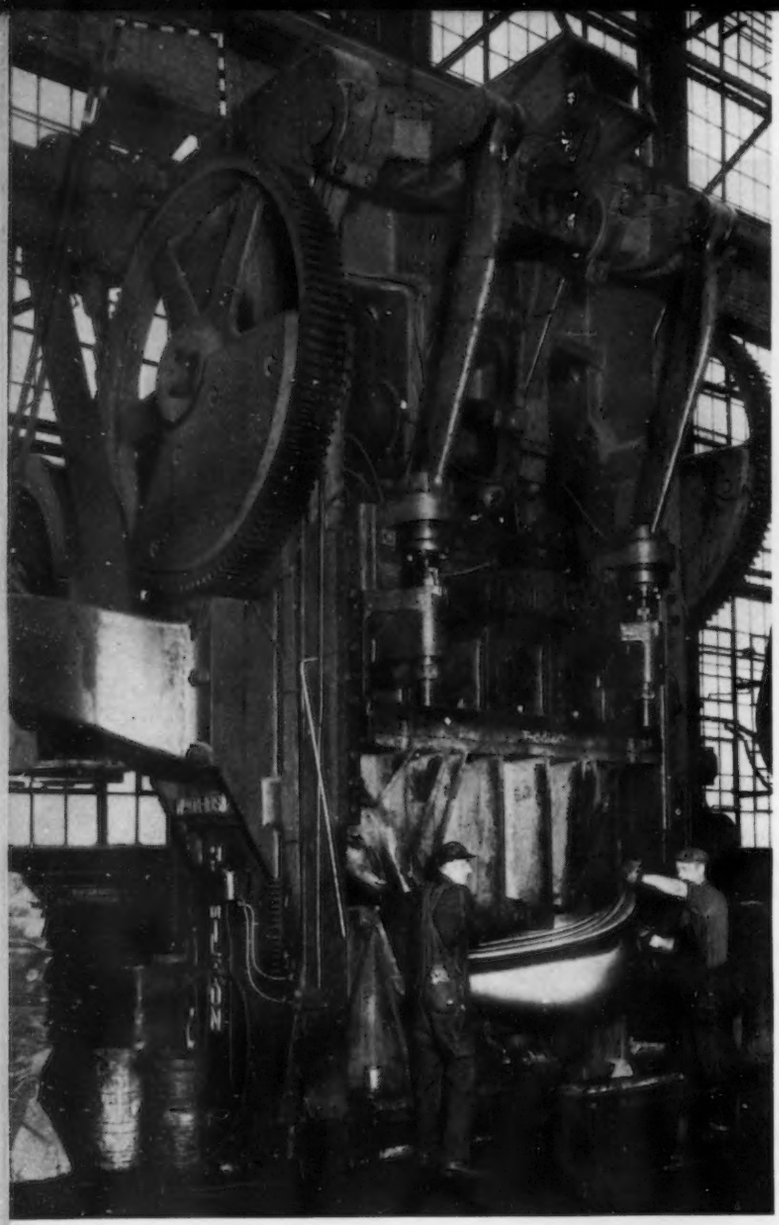
The outside of the mold or "cheek" is rammed in a similar manner to the core. A wood frame is used instead of the metal flask, and, when pouring, a "jacket" is used much the same as for "snap-flask" molding.

Since the ramming is carried on through the use of a jolt machine, variables resulting from uneven hand or pneumatic ramming are largely eliminated, and this method insures a uniform mold throughout. So far as is known, this marks the first successful use of jolt machines in the manufacture of ingot molds. By the elimination of costly metal equipment for wood equipment, it is possible to properly rig each job ideally instead of finding it often necessary to use misfit equipment. This aids in uniformity of results.

After ramming, the mold is allowed to air-dry for from one to three days before casting. At the end of this time the entire mold has hardened throughout, while under the forced oven-drying used by the previous process, uniform and complete drying was impossible. Since no binding agents except the cement and water are added, gas forming elements found in the usual "natural" molding

(CONTINUED ON PAGE 89)

Buick Fender Stamping



AT LEFT

THIS huge Hamilton press towering in the Buick press shop is used for the first draw on the new front fender.

o o o

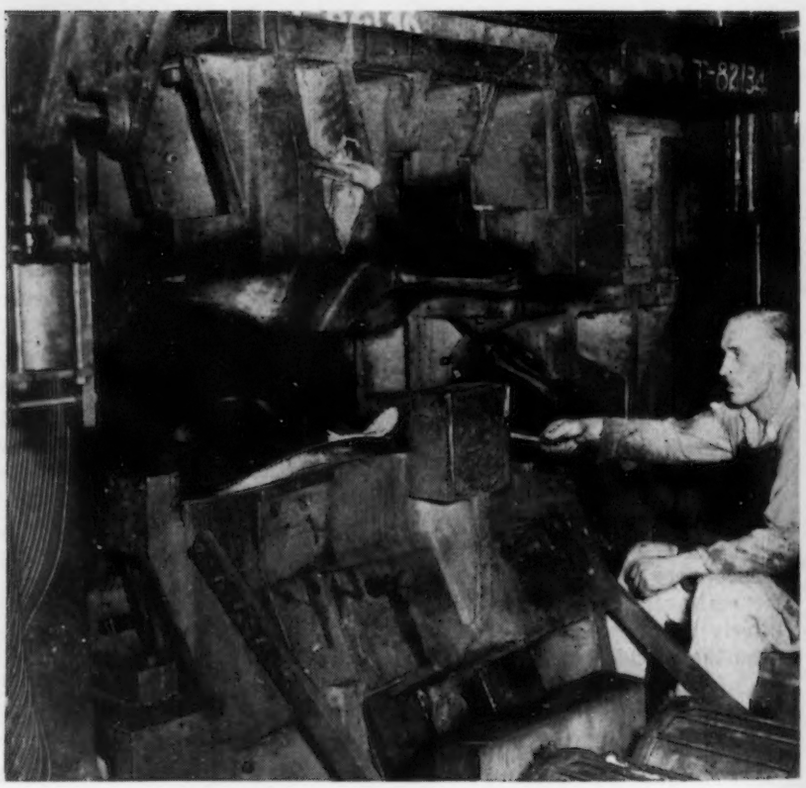
BELOW

ANOTHER Hamilton press, this one set up with two dies, is used on the front fender. The first operation is to trim and redraw nose end, the second operation is to finish redraw nose end.

THE one-piece front fender of the 1937 Buick cars involves metal stretching far beyond the normal yield point of sheet steel and thereby presented a problem for the Buick stamping department that was approached with "misgivings and trepidation," according to the Buick Motor Co. The fender on the 1936 cars was something of a problem also, but because it was done successfully the Buick engineering department proceeded to model the lines and curves for a bigger and deeper front fender for the 1937 Buicks.

Harry Herron, superintendent of Buick's sheet metal division, states that he knew the press shop had been given the toughest job that it had ever encountered. The new fender was first modeled in plaster of Paris, then work was started on temporary dies which would produce sample fenders in one-quarter size. When, after considerable effort, the first quarter-scale fenders were drawn successfully, Mr. Herron said they were ready to transfer the principles of the small temporary dies to the large dies weighing upward of 25 tons each.

The making of these dies was of itself a difficult job, but the stretching of the metal was still another task that could not be mastered quickly. A sample blank was put through the presses, the sheet being scribed with 2-in. squares over its entire surface. Starting with a blank 92½ in. long, the forming operations stretched the metal to 102½ in., an extension of 10 in. or around 11 per cent. Surprising as it may seem, says the Buick company, the elongation of the deep turn-under at the front end is not very large. In fact, the biggest stretching takes place at one section at the rear end. Here a 2-in. square distorted to 2 9/16 in.—stretching 9/16 in. in the width and 13/16 in. in length. At this section the local elongation was about 41 per cent



g Presents Unique Problem

lengthwise and 28 per cent in the width.

This year's fender skirt on the Buick models is made up of three stampings which are welded in one operation to the fender. The new welding machine has an automatic clamping feature and utilizes a hand-grip gun welder which supersedes the former practice of spot welding. With this construction, all fender fastening holes are incorporated in the skirt instead of the fender stamping so that any changes required in the attachment can be readily made in the small skirt fastenings. Previously it was necessary to make costly changes in the large dies to accommodate changes in the fastening holes.

The new fender requires 15 separate operations on the presses and 12 finishing operations, including welding of the splasher, making a total of 27 operations. These operations in their proper sequence are as follows:

The first operation is blanking on a No. 96-F Toledo press, followed immediately by rolling through power rolls to prepare the sheet for forming operations. The first heavy draw is on a large Hamilton press, then the stamping is trimmed on a No. 14½ Toledo press. From this point on follow a series of multiple die set-ups that are unique in the metal stamping art. Operations five and six in this series are combined in one press, using two different dies. The operations comprise rough trim and restrike of the rear end on one die, and cut scrap at the front of hood sill in the second die. This operation is performed on a No. 94-H Toledo press.

In similar fashion, operations seven and eight are handled on the same type of Hamilton press as is used for the first draw. Here again are two separate dies—one for trim and first redraw of nose

(CONTINUED ON PAGE 61)

AT RIGHT

TOLEDO No. 97F press features a multiple-die set-up for finishing operations on the front fender. The operations are—rough trim nose end, finish trim and flange running board, finish trim and flange hood sill, finish redraw nose end.

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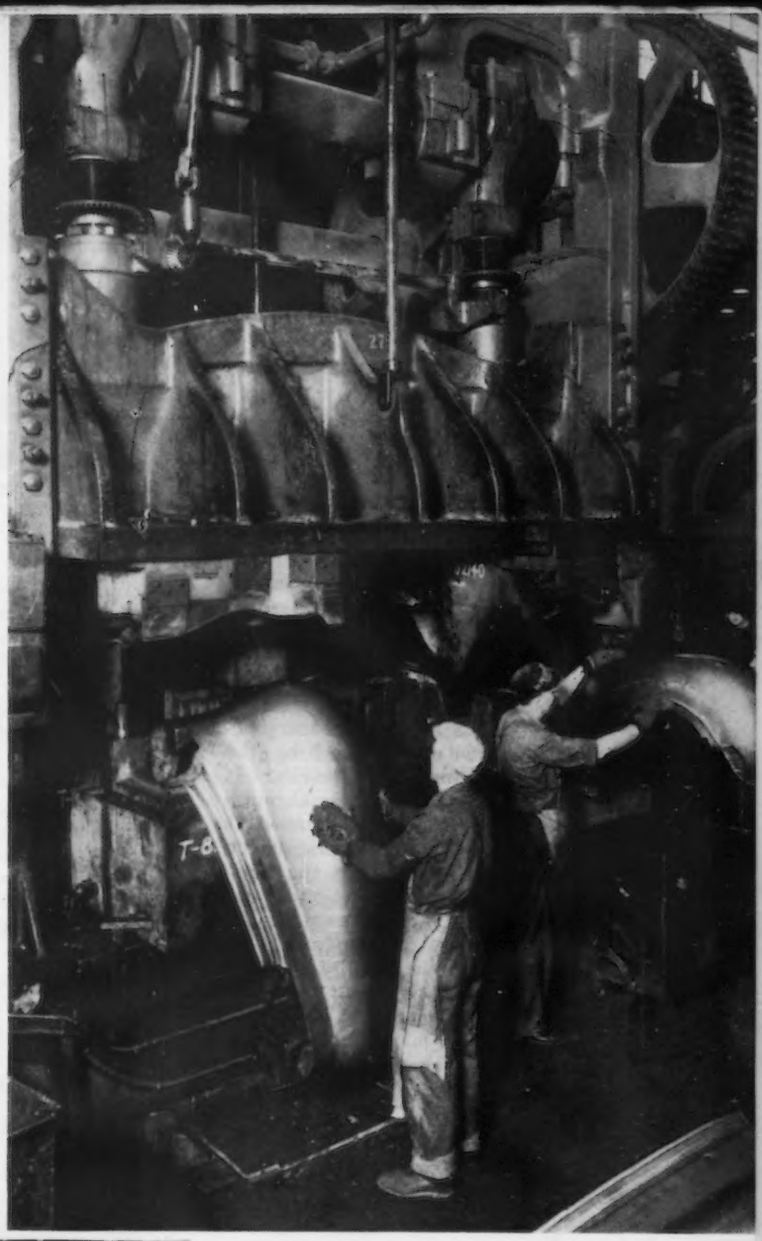
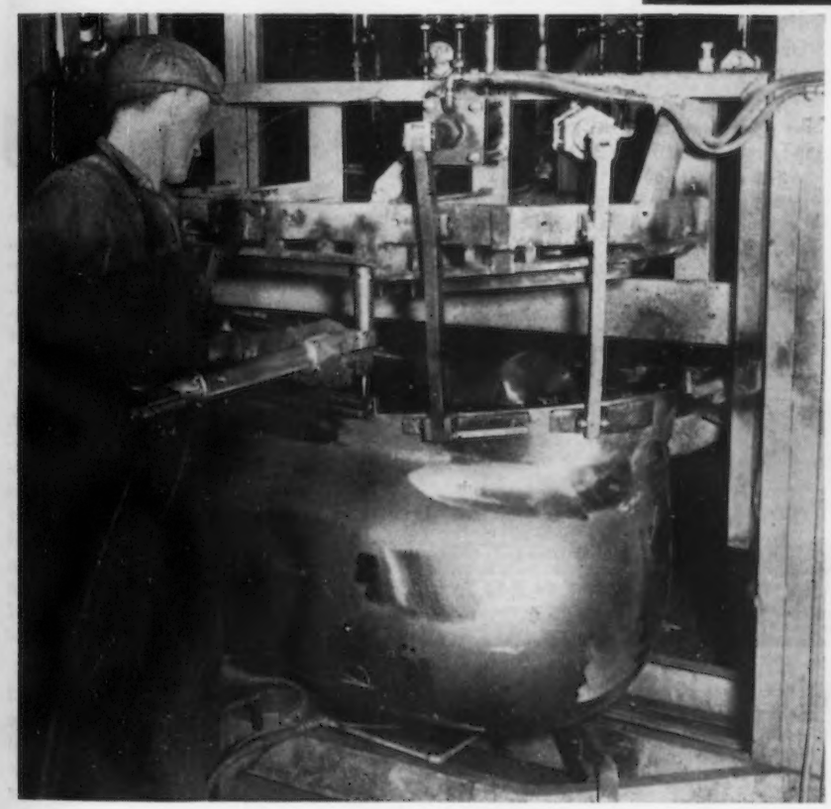
BELOW

VIEW of new type gun welder used for attaching fender skirt sections, making the fender a rigid one-piece unit.





IMPROVEMENTS IN PRODUCTION

Reciprocating Sanding And Rubbing Machine

AN electric sanding and rubbing machine of reciprocating action has been developed by the Sterling Products Co., Detroit. It is driven by electric motor through a flexible shaft, and is intended as a companion to the air-driven model manufactured by the company. The sending action is reciprocal with ⅝ in. travel of the sanding pad, at speeds from 1750 to 2800 complete oscillations per minute, depending upon the type of work performed. This movement, it is emphasized, duplicates the natural back and forth motion of hand sanding and rubbing.

A patented feature is the flexible rollers of special composition rubber and fabric which are attached floatingly by pins to the sander block. In addition special pads varying in flexibility are available. Due to this construction feature, there is no restriction in the movement of the block, and the machine is applicable to curved and flat surfaces of metal, fabric, wood, composition, leather and marble. It can be used for such delicate operations as the finishing of stringed musical instruments, de-hairing and buffing of leather, to the heavier production requirements of finishing machine tools, trains and auto bodies.

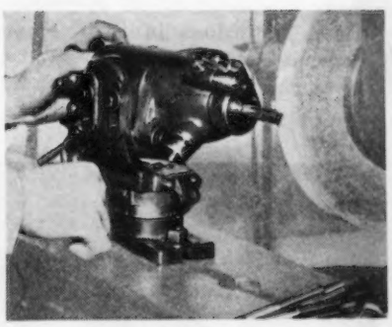
The machine is designed for wet or dry sanding and finishing. A water connection is provided with a series of openings on each side of the block, providing a spray that is readily adjustable to the job requirements. For wet sanding with naphtha, gasoline and benzine, a special block with sterlite base is provided. From one to five sheets of abrasive may be attached to the pad at one loading. Ordinary size sheets are cut in three pieces without waste.

The machine is portable and may be operated from any electric outlet, either 110 or 220 volt, in the plant or outdoors. Three different types of mountings are provided: motor mounted on a metal plate for use on the work bench; motor suspended from ceiling by means of bale type handles; and a bench height pedestal model, with three-leg caster base, facilitating the moving from one department to another. The sander is 7 in. long by 4¾-in. high by 3¾-in. wide and weighs 7½ lb. It is balanced and has a comfortable fit to the palm.

THREE types of mounting are provided for this electric sanding and rubbing machine. Arrangement of the sander pad is shown above.

New Tap Chamfering Fixture

A tap chamfering fixture for sharpening any size and type of tap up to and including 1¼ in., without reference to number of flutes, or shank length, is announced by Detroit Tap & Tool Co., Detroit. The use of the fixture insures, it is said, that in the regrinding of taps, there will be concentricity with the shank and that difficulties arising from inaccurate flute spacing will be eliminated.



Use of cams for each flute type, and each tap with a different number of flutes, is avoided by rotating the tap on an eccentric axis and indexing by means of a finger and registering with the reground flute face. This is said to give balanced relief regardless of flute spacing errors, as the method of indexing compensates for inaccuracies.

Spring collets are used to hold and locate the tap in the fixture which can be adjustably mounted for height on any type of grinding machine in either a right or

ON AND SHOP EQUIPMENT...

left hand position. The amount of eccentricity or relief can be quickly regulated by a graduated adjustment on the fixture which enables changing the amount of relief without the use of separate cams.

In grinding, a light pressure of the hand is applied to bring the finger against the stop on the fixture, while rotating the tap by means of the handle. The latter imparts to the tap an oscillating motion. The fixture is completely universal in character permitting the quick sharpening of all taps including taper, plug, and bottoming types.

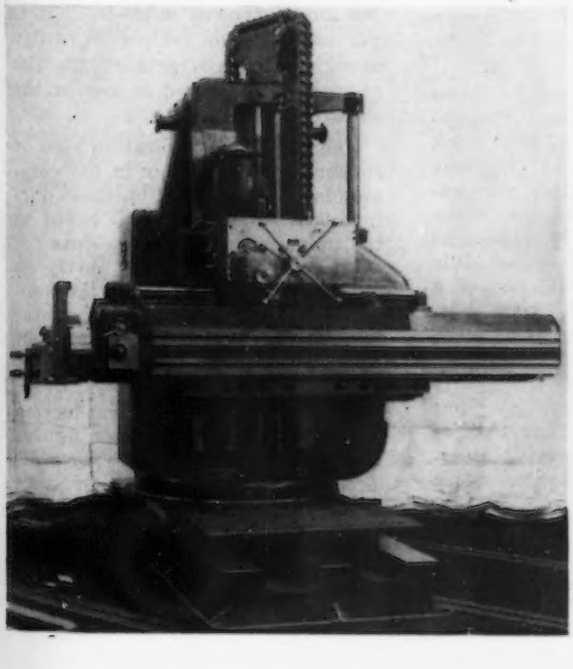
Portable Planer for Bulky Work Pieces

A MOVABLE planer, Collet & Englehard, Offenbach-Main, Germany, W. A. Schuyler, 250 West 57th Street, New York, American representative, is here illustrated. The weight of the machine is 22 tons. The base diameter, on which the work unit swivels, is 56 in. Overall height is 12 ft. Push button control is employed in stopping and starting and is also available for varying the speed of the driving motor. Cross-slide length is approximately 12 ft. Maximum stroke is 6½ ft. Cutting speed can be varied from 19 to 39 ft. per min.; return speed from 39 to 78 ft. per min. Vertical saddle movement is 4 ft. 7 in. with a maximum tool height from bed bottom.

Vertical Honer Features Range of Adaptability

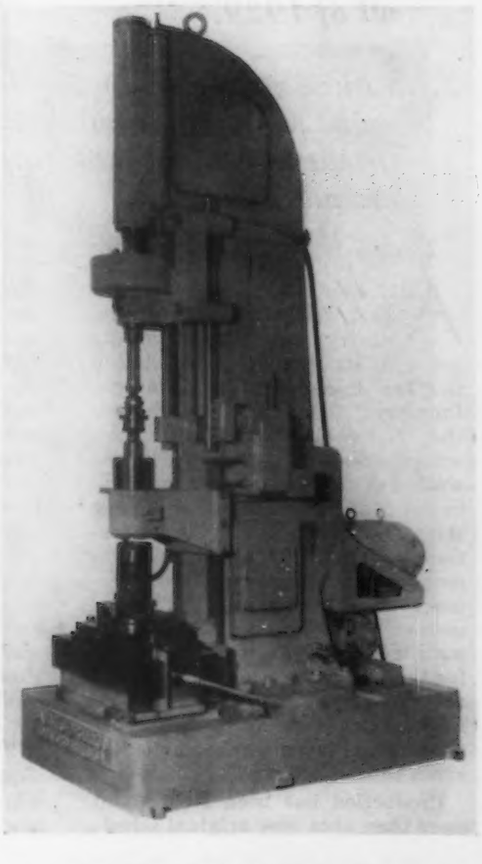
NEW design and appearance are embodied in the illustrated addition to the Barnes Drill Co., Rockford, Ill., line of honing machines. The machine employs variable fluid-motor speeds which provide a speed hydraulic transmission for spindle rotations, and as shown, is set up for any speed between 100 and 250 r.p.m. A tachometer positioned on the reciprocating head indicates the exact speed, of an infinite number, which is being used. Capacity is provided for all cylinders from 3-in. to 10-in. diameter, to any depth within standard spindle travel of 20 in. The illustration shows an air counterbalance paralleling the inclosed hydraulic cylinder at the top and directly connecting to the reciprocating or vertically travelling carriage which runs on angular contact bearings, mounted on hardened steel vertical shafts.

The set up shown, covers sleeves 5¾ in. bore by 15 in. long. This work is held on the flange-end, under collar and clamp. A micromatic automatic hone is employed. The upper horizontal lever provides for short stroking. The lower horizontal lever controls the skip stop for lift out. The machine is operated by one 10 to 15 hp. motor at 1200 r.p.m. Weight is approximately 7000 lb.



AT LEFT

PLANING machine for use on pieces that cannot be conveniently machined on stationary equipment.



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HYDRAULIC honing machine for cylinders ranging from 3 to 10 in. diameter. Infinitely variable speeds between 100 and 250 r.p.m. are provided.

THIS WEEK ON THE ASSEMBLY LINE

. . . Automobile production tops 100,000 units for the first time since the week ended July 11.

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. . . Enthusiasm exhibited by the public at various shows confirms industry's optimism, and points to a 5,000,000 car and truck year or better.

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. . . Truck sales should reach 680,000 by end of year as sales for 10 months exceed those for all of 1929.

o o o

. . . United Automobile Workers claim remarkable gains in union membership since and just prior to the election, pull for 40-hr. week and an annual wage.

DETROIT, Nov. 17.

ALL over the country in the past week the automobile industry has been trying to prove in its various shows that it is "The Pacemaker for American Industry." That is the slogan for the National Automobile Show which opened in New York last week and it looks as if there will be no challengers to it, for during the past six months, in the preparation for the 1937 models, the automobile industry has provided a tremendous stimulus to the capital goods industries in purchases of machinery and related equipment for the new cars. Now the builders are pushing production just as rapidly as possible to meet the phenomenal response the public has given to the new cars.

Production has been stepped up more than once over original schedules and already there are a number of inquiries out for new machinery to bolster up the week spots of the line so as to increase the net output. Buick, for example, which planned to make about 21,000 cars in November and December, has revised its schedule several times and has now set a December schedule of 28,000 cars. Last week the company came within a few cars of an all-time high on daily production, when 1333 cars were assembled at the Flint plant and 272 at the Los Angeles assembly plant of General Motors. Unfilled orders are placed at close to 60,000 units.

Sales Predictions Revised Upward

Most companies have already made sales predictions for the 1937 model year, but if the present trend is continued these predictions will have to be revised. Ford has placed his bid at 1,300,000; Chevrolet at 1,200,000; Plymouth, 600,000; Dodge, 500,000; Buick, 240,000; Oldsmobile, 225,000; Pontiac 230,000; Packard, 165,000; Hudson and Terraplane, 125,000; Studebaker and Nash, over 100,000 each, and Willys, 70,000. Taking into account those not listed, the figure will run well over 5,000,000 and, if upward revision in sales budgets continues, the industry may possibly eclipse the 5,621,000 record number of units set in 1929. All records for the reception accorded the announcement of new models have been exceeded at the various shows which is an indication of what is ahead. Chevrolet estimates that 125,000 orders were placed with dealers for immediate delivery over the announcement week-end. It is yet too early to get the Ford figures, but there is certainly no lack of interest displayed in any of the show rooms.

There is every indication also of continued high volume in the commercial car and truck business during 1937. This forecast is based on the industry's accomplishments for the past 12 months and partly on analyses of the market for the coming year. Retail sales in motor trucks for the first 10 months of 1936 have already exceeded the entire 12-month period of 1929, the previous peak year for production and sales. The comparable figures were 575,000 motor trucks for 1936 as against 527,057 in all of 1929. Estimates are that 680,000 vehicles will have been sold when the figures for this year are available in January. This will represent an increase of 24 per cent over the volume in 1935. The estimate for

1936 production, including exports, is 830,000 units.

Truck usage has been extended largely by the improvements in highways, by the modernization of motor truck equipment and by the rehabilitation and rebuilding of shipping docks at plants to facilitate the handling of their commodities by truck as well as by rail and water. Truck sales have gone ahead despite excessively high taxes and a multitude of conflicting state regulations that have been adopted haphazardly and more or less intended to curb truck use. Truck manufacturers and operators look to the newly created Motor Carrier Division of the Interstate Commerce Commission as one of the means for bringing about uniform laws relating to truck usage so that the use of this form of transportation may go ahead unhindered by legislative shackles.

Farm Market for Trucks

Of the total market for trucks a large percentage lies among farms, and there is every indication that the farmer's buying power will increase rather than decrease. The building trades are improving and will provide another source for truck sales. The current year has seen a large volume of replacement sales to fleet operators, and during the coming year a substantial increase in this volume of business is expected as a result of the general upward swing of recovery. There is an increasing trend toward the use of lighter units, including ½-ton delivery vehicles used by small merchants, and it is anticipated that in 1937 this class of vehicle will amount to about 50 per cent of the 1½-ton truck volume. Such companies as Ford and Chevrolet stand to gain the most by this trend, and this is one of the reasons why Chevrolet has pushed up its truck sales budget 10 per cent over last year, to an estimated 225,000 unit volume.

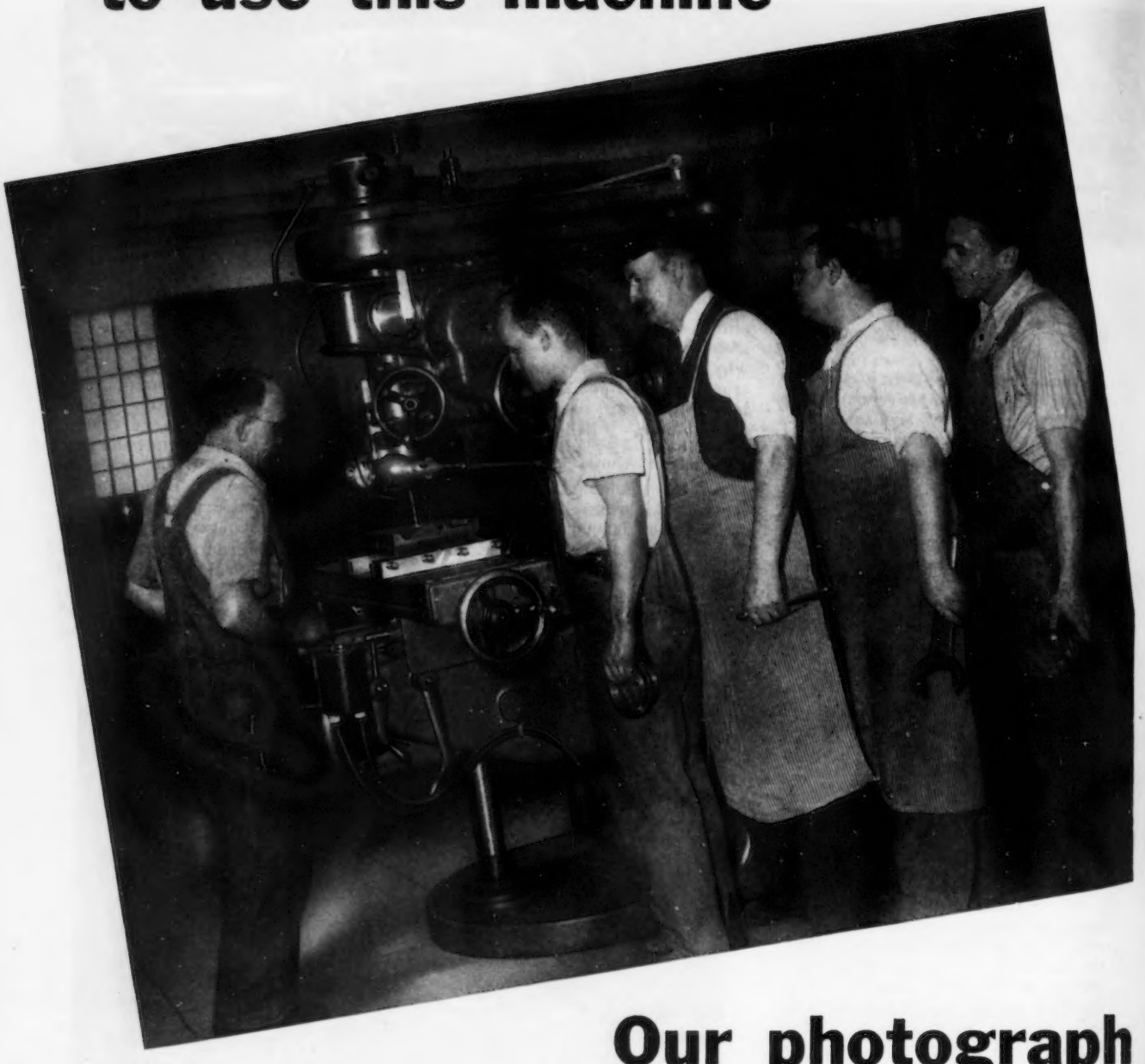
Production Above 100,000 Weekly

As was predicted last week, automotive output finally reached and topped the 100,000 mark. Ward's Automotive Reports estimates total production of passenger cars and trucks in the United States and Canada at 104,290 units for the week ended Nov. 14. This compares with 84,780 units the preceding week and is the first time since July 11 that weekly output has crossed the 100,000 mark. Ford is the chief factor in this week's advance, moving into large volume production on 1937 jobs for the first time and turning out approximately 18,225 cars at Dearborn and at the 11 assembly plants scattered through the country. Ford, incidentally, is ordering steel shipments in at a rate to cover 7000 units a day beginning this week, although it is not expected that daily production will go much over

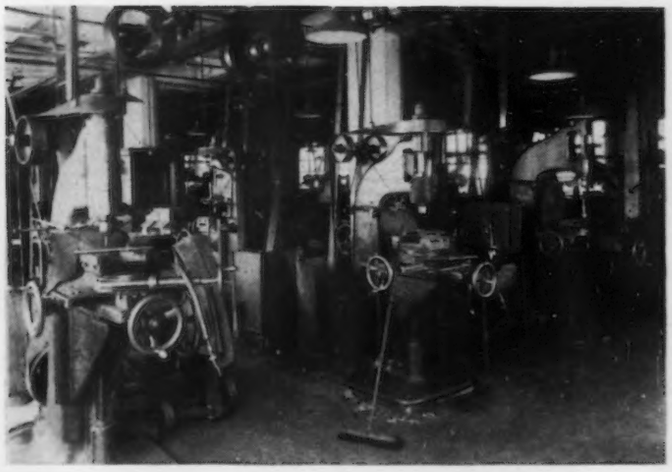
FISHER Body will consume 35 per cent more steel for 1937 "Unisteel" models than for 1936s, or about 600,000 tons, on the basis of equal production. For new dies, $10,000,000 were expended; for buildings and machinery, $11,000,000; for changeover and rearrangement, another $4,000,000.

"Men line up"

to use this machine



Our photograph is specially posed to illustrate the remark made by a user of the Pratt & Whitney Universal Die Sinker



This picture was not posed. It shows six old style die sinking machines about to be scrapped. They were replaced by three P&W Universal Die Sinkers which turned out more work at lower costs.

Here is the true story . . . . . .

IT has become an oft repeated story to us—differing only in the names of the men and the companies involved. A P&W Universal Die Sinker is purchased and installed. The men like it. After a month or two the boss finds them waiting to use it—lining up for it—doing other work until the machine is available.

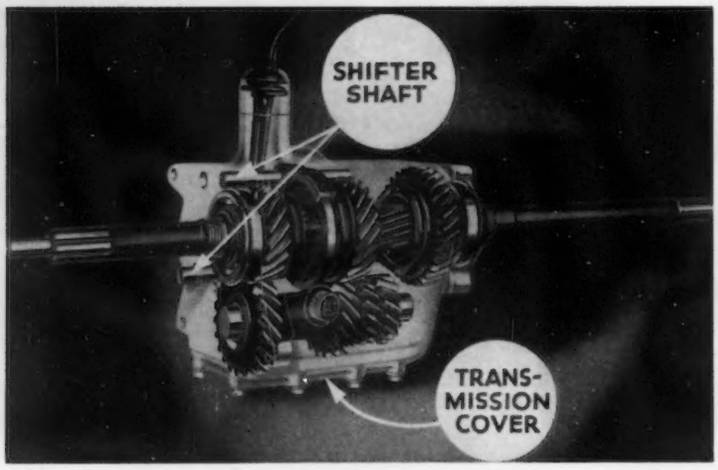
That is the story the manager of a large die shop recently told us when he ordered his second Universal Die Sinker. We have heard it before from many a shop foreman. The reason for it is simple.

The P&W Universal Die Sinker, in addition to straight cutting, produces cherrying cuts without special attachments or special cutters, using power to feed the cutter. This has transformed the difficult slow hand operation of cherrying into a quick machine job. It has eliminated long hours of costly bench work. Expensive cherrying cutters mounted on half centers no longer are needed. Standard die sinking tools only are used for either straight or cherrying cuts.

Experience shows that the Universal Die Sinker can produce savings up to 75% in regular production, on a wide variety of die work. No longer must the impression be typed out by hand. The high speed spindle means a smoothly milled finish to accurate depth. There are no difficulties in machining cylindrical or spherical cavities, radii, or odd angles.

These are a few of the reasons why the P&W Universal Die Sinker is such an excellent investment in any die shop. Repeat orders prove its excellence. The complete story is contained in our literature which will be sent to any interested executive. Write to Pratt & Whitney Division, Niles-Bement-Pond Company, Hartford, Connecticut.

PRATT & WHITNEY
UNIVERSAL DIE SINKERS



BY a complete redesign of the transmission, Cadillac has been able to reduce the weight by 85 lb. for the Model 60 and the LaSalle. Putting the cover on the bottom and shifter shaft on the side has eliminated the hump in the front compartment.

5000 units for the current week. Chevrolet is fighting to push production from 5000 to 6000 units daily and should attain this figure before very long. As a further example of the present trend, Chrysler has recently put a third shift on its motor line and cut down its lunch period from 30 to 15 minutes in order to build up a bank of motors to meet anticipated demands. Because of the increases in its various units and particularly at Oldsmobile, which finally swung into volume production, General Motors pushed output to 45,130 cars, a jump of almost 6000 units over the previous week. Chrysler divisions, with both Plymouth and Dodge operating at peak capacity, produced 26,000 units compared with 24,050 last week.

Various statistics compiled by the Detroit Board of Commerce bear out the rapid strides made in the industry during recent weeks. For the fourth consecutive week, Detroit Edison power sales reached an all-time high. Street car riders have increased and, when the figure for industrial employment is available in a few days, it is expected it will show a new high for the year. At the same time the number of families on welfare and on the WPA have been decreasing from week to week, reaching new lows for the year, although about 35,000 such families are still listed.

Bonuses to Workers

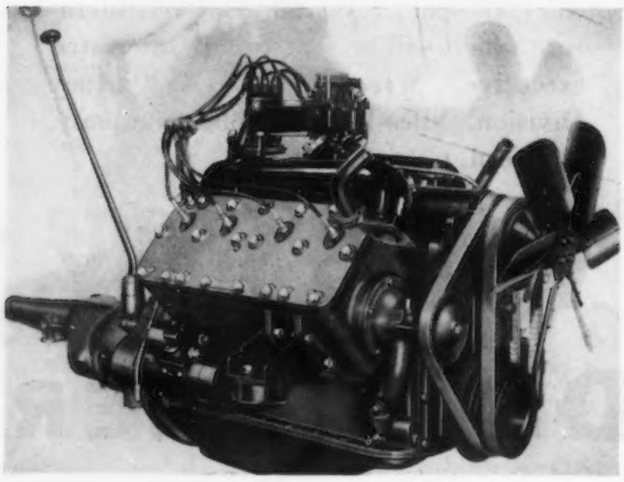
With earnings statements of the various companies showing profits for the first nine months equal to all of 1935 and better, a number of the automotive companies are beginning to give bonuses to their workers, "Appreciation Funds" or straight hourly wage increases. Chrysler's $4,000,000 disbursement to workers was followed by an announcement from General Motors of a $10,000,000 disbursement plus a 5 cent per hr. wage increase. Hudson has raised wages from 5 to 7 cents per hr. and Packard has put through a 5 cent per hr. increase to factory workers, plus a $10 monthly salary increase for office workers earning less than $200 a month.

Leaders of organized labor, principally those of the United Automobile Workers, discount these wage increases to a great extent by indicating that in a number of plants that still operate on a piecework basis, there were rate cuts as high as 25 per cent before the new over-all wage increases were announced. "Remarkable progress" has been made in signing up members for the union since the national election and for a few days before it, according to Homer Martin, president of the U.A.W. Philip Murray and John Brophy, United Mine Workers, and men who have been connected with John L. Lewis' Committee for Industrial Organization in the steel mill drive, were in town last week to lend impetus to the drive in the automotive industry, which has taken a new lease on life since President Roosevelt's reelection and the election of Frank Murphy to the governorship of Michigan. On more than one occasion Mr. Murphy has indicated his leanings toward organized labor and no doubt will assist in the formulation of state laws that are favorable to the union movement and to the further protection of workers in industry.

Among the aims of the U.A.W. recently reiterated are the establishment of an annual wage to obtain security during slack seasons; elimination of the so-called "speed-up"; straight seniority rights; retention of the 40-hr. week and 8-hr. day, with time and a half for over-time, but ultimately with a progressive reduction in hours to increase reemployment; improved safety measures; and the establishment of "true" collective bargaining.

Labor leaders assert they are not looking for trouble and do not wish to tie the industry up in a strike. Nevertheless they are determined to sign up workers and to represent them in the plants. A few weeks ago the question of discrimination came up in the Dodge plant of the Chrysler Corp., in which Chrysler officials met with members of the U.A.W. and also advisors from Lewis' CIO. Threats of a possible walk-out were considered sufficiently serious by the management to concede to the rehiring of three men who had been laid off, but who had failed to be called back to work when the new programs were started. The management admitted that in the rush to start new model production, seniority rules had not been strictly observed, but promised to adhere more strictly to these self-imposed regulations in the future. As far as the unions are concerned, this is a distinct step forward, since a few years ago no Detroit manufacturer would have consented to confer with outside representatives whose strength in the plants is still undefined.

Against these charges that the manufacturers are giving hourly



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LA SALLE uses a V-8 engine similar to last year's Cadillac engine. Displacement has gone up from 248 to 322 and the horsepower from 105 to 125, compared with the straight 8. By knocking down 200 lb. on the weight, there is now 8.1 cu. in. of displacement per 100 lb. as against 6.6 last year.

o o o

wage increases with tongue in cheek, there is the statement of the Automobile Manufacturers Association that the average yearly income of all workers in the automobile industry has been increased almost $500 since 1934. During the 1936 production year average

BECAUSE everybody followed Cadillac's 1936 style of horizontal grille bars, the 1937 models have a square die-cast grid.

IN order to eliminate the hump in the floor, Oldsmobile splits the propeller shaft in two, with three universal joints and a center self-alining bearing support, illustrated. The universal joint trunions have needle bearings.

earnings of all workers in the industry amounted to $1,210, in contrast to $750 in 1934. Employment records showed that 69 per cent of automobile factory workers were steadily employed throughout the entire 12-month period and that their average annual earnings amounted to $1,490, or $170 more than the average earnings of steady workers in 1934. Substantial improvements were also made in labor turnover. The monthly ratio of lay-offs in automobile factories was reduced from 7.17 to 4.95 per cent. During the 1936 production year, the total fluctuation in the industry's employment schedules from peak month to low month was only 41 per cent, as compared with 103 per cent in 1934. During the past model year employment at no time fell below 70 per cent of the total number of workers employed during the peak months. Yet during this period production fluctuated from a low of 217,000 cars and trucks in February to a high of 460,000 in April.

One answer to this apparent anomaly is the fact that 25,000,000 additional man-hours of employment were provided to automotive workers during last winter by permitting them to build up inventories of automotive parts and subassemblies for use on the assembly lines during the peak production and buying period in the spring.

Application of Photoelectric Pyrometer to Bethlehem Shape Mills

(CONTINUED FROM PAGE 50)

of scale on the bar or by steam and water vapor surrounding the bar, so that the installation must be made with the view of eliminating these objectionable factors.

In the case of the photoelectric pyrometer now in operation at Bethlehem's Saucon Plant, the interference was eliminated (as shown in the accompanying sketch) by mounting the phototube sufficiently remote from the mill to avoid the steam disturbance and by focusing the tube on the center of the flange of the bar which, being in a vertical plane when approaching the mill, is generally free from scale and water. This arrangement presents a practically continuous source of radiant energy passing before the adjustable aperture or "eye" of the photoelectric tube housing — assuring the most uniform results from the tube operation.

Physically the installation consists of a General Electric PJ-22 phototube in a cast iron holder with a light tunnel and adjustable aperture, together with a G-E CR-7505 amplifying Pliotron control for changing the micro-ampere output of the tube into milliamperes for actuating an indicating ammeter that is calibrated in terms of degrees Fahrenheit of the heated body. This calibration is made by checking against an optical pyrometer at given points on the scale.

The sketch shows the apparatus involved and the setup as applied to the particular mill. The control panel is mounted on the building wall in order to protect it from undue heat and vibration. The indicating instrument, however, is mounted in the roller's pulpit, so that the operators, with full view of the temperature of the bar entering the mill, can adjust the screwdown controls for setting the mill.

The operating results have been successful and the improved mill yield resulting from accuracy of section rolled has justified the application. The only trouble experienced has been in connection with the indicating instrument and that has been taken care of, so that we have every reason to expect sustained improvement in mill operation by reason of the precise knowledge of the temperature of the steel being rolled.

Buick Fender Stamping A Unique Problem

(CONTINUED FROM PAGE 53)

end, the other for finish redraw of nose end.

Now we come to an unusual set-up on a Toledo No. 97-F press which has four separate dies for operations nine to twelve, inclusive. Operation nine is rough trim of the nose end; operation ten, finish trim and flange running board end; operation eleven, finish trim and flange hood sill; and operation twelve, finish trim and flange nose end and flange bumper hole.

Operation thirteen—finish trim and flange outside is handled on a No. 796¼ Toledo press. Operation fourteen is the trim and flange of radiator flange on a No. 14½ Toledo press, and the last operation, also on a No. 14½ Toledo, is the piercing of two holes.

The foregoing covers the principal press shop operations in the forming and finishing of the fender stamping. Twelve additional operations are required before the fender is ready for the paint shop. These include flanging of edges, re-flanging of running board, and a number of finishing and repair operations. This group also includes a number of interesting welding operations featuring a new welding machine which is used for welding the skirt stampings to the fender.

Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available. Bold Face Type Indicates Changes This Week.

	October, 1936	September, 1936	October, 1935	Ten Months, 1935	Ten Months, 1936
Raw Materials:					
Lake ore consumption (gross tons)[a]	4,384,809	4,026,690	2,910,863	24,735,249	35,818,890
Coke production (net tons)[b]	.....	3,994,741	3,141,851	28,503,247	.....
Pig Iron:					
Pig iron output—monthly (gross tons)[c]	2,992,968	2,730,293	1,978,411	16,835,436	24,557,476
Pig iron output—daily (gross tons)[c]	96,547	91,010	63,820	55,379	80,516
Castings:					
Malleable castings—Production (net tons)[d]	.....	46,552	43,467	376,520	.....
Malleable castings—orders (net tons)[d]	.....	44,361	45,246	362,260	.....
Steel castings—production (net tons)[d]	.....	76,617	42,597	325,030	.....
Steel castings—orders (net tons)[d]	.....	56,877	34,553	326,914	.....
Steel Ingots:					
Steel ingot production—monthly (gross tons)[e]	4,545,001	4,161,108	3,142,759	27,194,171	38,150,305
Steel ingot production—daily (gross tons)[e]	168,333	160,043	116,398	104,593	146,170
Steel ingot production—per cent of capacity[e]	76.70	72.92	52.58	47.25	66.60
Finished Steel:					
Trackwork shipments (net tons)[c]	5,547	5,722	3,495	36,114	58,478
Steel rail orders (gross tons)[c]	119,237	25,800	38,742	363,299	804,065
Sheet steel sales (net tons)[f]	.....	255,557	226,209	1,981,070	.....
Sheet steel production (net tons)[f]	.....	213,706	222,963	1,991,675	.....
Fabricated shape orders (net tons)[g]	.....	112,594	102,708	880,675	.....
Fabricated shape shipments (net tons)[g]	.....	137,008	98,444	924,256	.....
Fabricated plate orders (net tons)[d]	.....	34,302	30,530	203,615	.....
Reinforcing bar awards (net tons)[c]	22,135	18,755	31,865	277,840	297,500
U. S. Steel Corp. shipments (tons)[h]	1,007,417	961,803	686,741	6,027,964	8,875,124
Ohio River steel shipments (net tons)[f]	.....	95,705	104,659	776,170	.....
Fabricated Products:					
Automobile production, U. S. and Canada[k]	..... *	135,130	283,337	3,349,377	.....
Construction contracts, 37 Eastern States[l]	$225,839,900	$234,271,500	$200,595,700	$1,392,293,400	$2,267,468,100
Steel barrel shipments (number)[d]	.....	787,380	884,888	5,696,681	.....
Steel furniture shipments (dollars)[d]	.....	$1,549,808	$1,562,303	$12,374,298	.....
Steel boiler orders (sq. ft.)[d]	.....	1,055,502	784,341	5,095,992	.....
Locomotive orders (number)[m]	22	24	0	28	180
Freight car orders (number)[m]	1,310	3,100	810	8,103	38,658
Machine tool index[n]	.....	118.5	102.9	†102.9	.....
Foundry equipment index[o]	.....	161.0	140.0	†127.1	.....
Foreign Trade:					
Total iron and steel imports (gross tons)[p]	.....	59,993	59,569	358,824	.....
Imports of pig iron (gross tons)[p]	.....	15,080	17,168	99,098	.....
Imports of all rolled steel (gross tons)[p]	.....	28,618	24,444	176,762	.....
Total iron and steel exports (gross tons)[p]	.....	*235,571	238,358	2,622,825	.....
Exports of all rolled steel (gross tons)[p]	.....	*74,459	81,248	724,151	.....
Exports of finished steel (gross tons)[p]	.....	*66,040	63,954	620,507	.....
Exports of scrap (gross tons)[p]	.....	*152,314	145,850	1,797,468	.....
British Production:					
British pig iron production (gross tons)[r]	670,300	650,800	544,300	5,337,600	6,367,100
British steel ingot production (gross tons)[r]	1,060,500	1,027,000	907,300	8,127,600	9,678,500
Non-Ferrous Metals:					
Lead production (net tons)[s]	.....	32,982	42,618	339,375	.....
Lead shipments (net tons)[s]	.....	50,685	42,271	348,088	.....
Zinc production (net tons)[t]	46,297	42,283	36,716	353,480	431,479
Zinc shipments (net tons)[t]	54,035	51,847	47,033	375,486	446,345
Deliveries of tin (gross tons)[v]	6,005	6,200	5,355	49,715	61,730

†Three months' average. *Revised.

Source of figures: [a] Lake Superior Iron Ore Association; [b] Bureau of Mines; [c] THE IRON AGE; [d] Bureau of the Census; [e] American Iron and Steel Institute; [f] National Association of Flat-Rolled Steel Manufacturers; [g] American Institute of Steel Construction; [h] United States Steel Corp.; [i] United States Engineer, Pittsburgh; [k] When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; [l] F. W. Dodge Corp.; [m] *Railway Age;* [n] National Machine Tool Builders Association; [o] Foundry Equipment Manufacturers Association; [p] Department of Commerce; [r] British Iron and Steel Federation; [s] American Bureau of Metal Statistics; [t] American Zinc Institute, Inc.; [v] New York Commodities Exchange.

Weekly Index of Rate Activity in Capital Goods, Adjusted for Seasonal Variation, 1925-27 Average = 100

THE IRON AGE Weekly Index Numbers of Capital Goods Activity

(1925-'27 Average = 100)

Last week	88.6	Same week 1933	43.1
Preceding week	86.6	Same week 1932	35.4
Same week last month	81.2	Same week 1931	49.7
Same week 1935	69.6	Same week 1930	72.2
Same week 1934	41.7	Same week 1929	107.4

THE activity curve for the durable goods industries continued to rise last week, the business level inclining to 88.6 per cent of "normal" as against 86.6 per cent two weeks ago and 69.6 per cent for the corresponding 1935 week. Since September, when there was a slump in business, the index has been steadily rising, and the latest showing represents the seventh advance in a row. Automotive assemblies figured prominently in the week's set-up, but on a seasonally adjusted basis steel mill activity and construction work contributed gains. Movement by rail of lumber products tapered slightly, and industry at Pittsburgh slowed.

THE IRON AGE's index on a cumulative basis shows at this point that the capital goods industries have produced 36.4 weeks of production in terms of the 1925-27 average. Over a comparable period last year only 27.5 weeks' output was reached, and in all of 1935 only 32.1 weeks of production were accumulated. For industry to have operated at "normal" so far this year it would have had to turn out 46 weeks' production, since 46 weeks have elapsed in 1936. It has lagged behind "normal," or the 1925-27 average rate, by about 9½ weeks' output.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Cram's Reports, Inc.; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

Standards Issued For Coal and Coke

THE American Society for Testing Materials, through the work of its Committee D-5, has just issued 24 standard specifications and methods of testing these two fuels. Inasmuch as the A.S.T.M. is the recognized agency for the standardization of sampling and testing methods for these materials, it is expected that the new standards will find wide application.

This special compilation gives all of the A.S.T.M. coal and coke standards in their latest approved form. Methods are given for sampling, sieve and screen analysis, designating size, and tests covering fineness, grindability, cubic foot weight, shatter, etc. Specifications cover gas and coking coals, foundry coke, sieves and screens for testing, and classification of coals by rank and by grade, the latter two developed by the sectional committee on classification of coals, sponsored by the A.S.T.M. under the A.S.A. procedure.

Copies of this publication, which is made up of 145 pages and a heavy paper cover, can be obtained at $1.25 each from A.S.T.M. headquarters, 260 South Broad Street, Philadelphia. On orders for ten or more copies, special prices are in effect.

WASHINGTON. . . . . .

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By L. W. MOFFETT
Resident Washington Editor, The Iron Age

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. . . CIO representatives take Carnegie-Illinois steel wage plan before President Roosevelt and Secretary of Labor Perkins.

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. . . Miss Perkins doubts that employee representatives can legally sign contracts for constituents—President says living costs should not be controlling factor.

o o o

. . . Labor adherents of Roosevelt openly declare plan to consolidate labor gains by political activity and further unionization.

WASHINGTON, Nov. 17.—In its efforts to unionize the steel industry the Committee for Industrial Organization, headed by John L. Lewis, has been quick to seek administration support for organization of mass industries of the country in return for the CIO-Labor's Non-Partisan League intense campaign for the reelection of President Roosevelt. The CIO and the league are constituted of almost identical membership. The league's President is Major George L. Berry, "Coordinator for Industry," who last week invited all representatives of industry and labor to meet in Washington, Dec. 10 and 11, with the Council for Industrial Progress to frame a "balanced program for industrial stabilization and advancement of the general welfare."

The two organizations, working together, emphatically claim credit for mobilizing an overwhelming labor vote for the President and therefore for his return to office. And there are major moves these organizations have in mind beyond organization of the country's mass industries. At fierce grips with the American Federation of Labor, threatening a permanent split in the ranks of organized labor, the CIO clearly is seeking to be the dominant faction and ultimately the sole parent body of organized labor, replacing the A. F. of L., its own parent, whose council has voted for suspension of the rebel CIO and its 10 unions.

Labor's Non-Partisan League, with permanent headquarters in Washington, is seriously considering organization of a third party to test its strength in the 1938 Congressional elections, and if successful, to make Lewis its nominee for President in 1940, it is reported. In short, the present objective is the institution of a Labor party to control the Federal Government four years hence. Manifestly, it is too early to indicate what force it may achieve.

Sharp Labor Cleavage

Meanwhile, the American Federation of Labor, at its fifty-sixth annual convention in Tampa, Fla., is faced with action in connection with its sharp cleavage with the CIO. One of major craft unions, the Metal Trades Department is sponsoring a resolution at the Tampa convention for the ousting of the CIO. Other craft unions stand ready to cast the die that would definitely set up two rival organized labor groups, the craft unions as represented by the A. F. of L., and the industrial unions as represented by the CIO, the latter not a participant in the convention. It remains to be seen whether a reconciliation will prevent the split. The prevailing bitter feeling existing between President William Green of the A. F. of L., and Chairman Lewis of the CIO, would seem to make it difficult to restore peace, though it is urgently desired on the part of many members of both factions. Mr. Green was increasingly embittered by, though he said he did not take seriously, the summons served upon him by the United Mine Workers, of which he is a member, and of which Lewis is president, to appear before it in Washington tomorrow and explain his activities in voting to suspend his own union and other CIO unions from A. F. of L. membership. Lewis was responsible for issuance of the summons. Green obviously will not appear.

President and Miss Perkins Consulted on Steel Wages

The steel industry unionization campaign was laid at the door of the administration last Friday and Saturday. The Carnegie-Illinois wage increase plan has been strongly opposed by Lewis and the activities of both Elmer J. Maloy and George A. Patterson, former Carnegie-Illinois employees, merely reflect agitation by Lewis.

The informal opinion of Miss Perkins that she found under the employee representation plan, as submitted to her by Maloy, no authority for the employee representatives to sign a wage agreement, brought forth an expression of surprise.

An official of the Carnegie-Illinois Steel Corp., at Pittsburgh, is quoted as follows:

"The plan has been in successful operation for three years and during that time proposals initiated by both the management and employees have been negotiated successfully.

"The opinion was especially sur-

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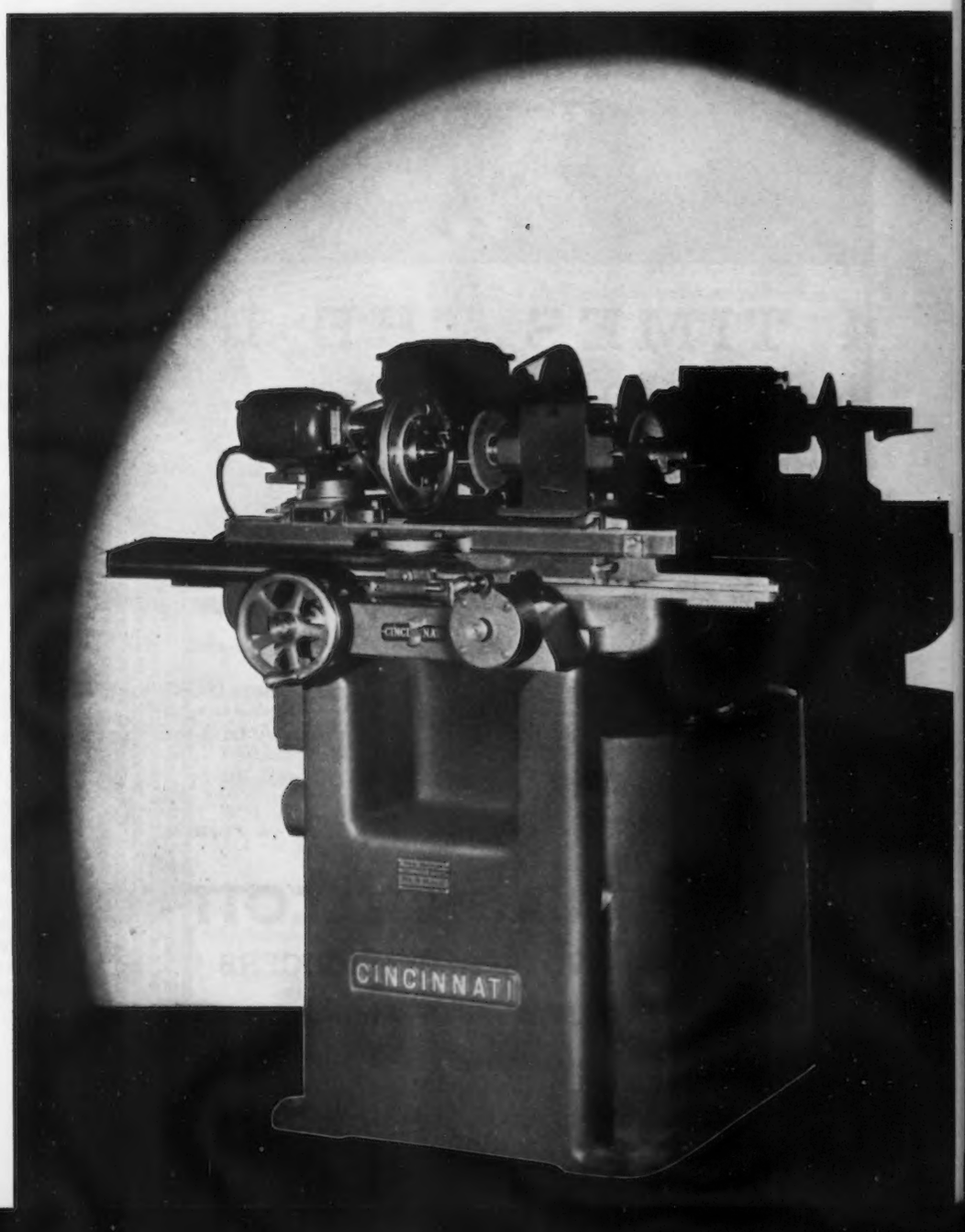


Patented

prising in view of the fact it would involve several million workers throughout American industry, outside those employed by the United States Steel Corp."

Regarding Maloy and Patterson, the official is quoted as saying:

"One of these two only recently was discharged for repeated violation of the company rules. The other is openly allied with outside interests, openly antagonistic to the employee representation plan. This person is now under the fire of his fellow representatives at at least two plants because of outside connections."

Miss Perkins declared, in reply to the request to pass on the legality of United States Steel Corp. representation plan, that the question involves issues now in litigation before the Supreme Court. The National Labor Relations Board, she stated, is the proper governmental agency to review the plan.

In referring to the wage increase plan, based on the cost of living, President Roosevelt said that living costs should not be the controlling factor in fixing wages where the cost of living was very low. He added that buying power also entered into the situation.

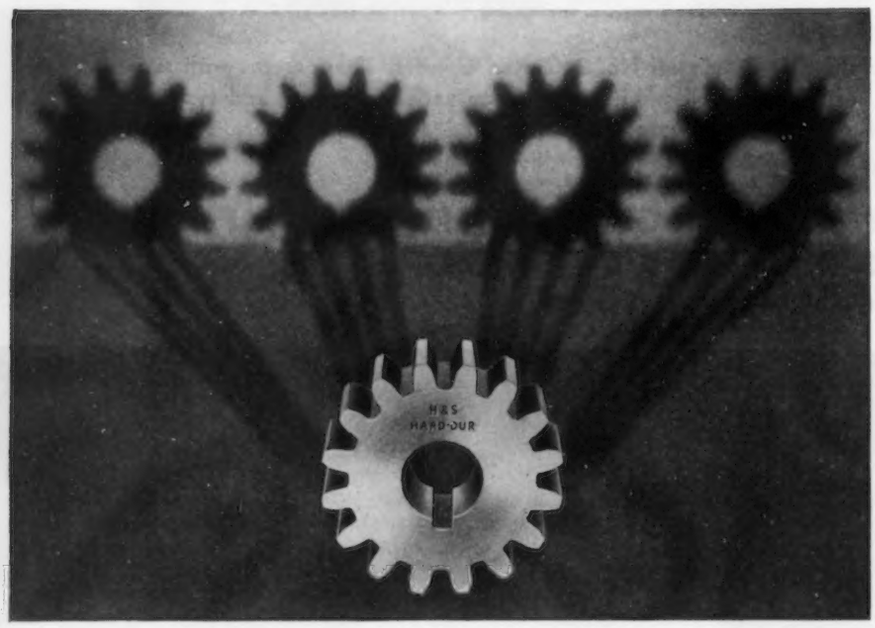
CIO Hails "Victories"

CIO adherents felt that they had achieved important, if not conclusive victories as the result of Washington developments. One source of satisfaction to them was the statement of President Roosevelt at a press conference Friday that the cost of living was only one and not a controlling factor in fixing minimum wages. The other development pleasing to the CIO group was an informal statement by Secretary of Labor Frances Perkins that it is her opinion that employee representatives of the Carnegie-Illinois Steel Corp., have no authority to sign contracts binding other workers of the corporation's plants to wage scale agreements. The third development accepted with favor was the presentation to the White House last Saturday of a petition asking the President, through legislation, to prevent steel companies from financing so-called company unions. The President did not see the bearers of the petition, Elmer J. Maloy and George A. Patterson, but they submitted it to White House Secretary M. H. McIntyre, who promised that it would be laid before the President.

Both Maloy and Patterson also inspired the statement from Miss Perkins. They are bitter opponents of the employee representation plan. Maloy is a particularly enthusiastic supporter of the CIO. He formerly was employed at the Duquesne, Pa., works and Patterson is an employee at the South Chicago works of the Carnegie-Illinois Steel Corp. Miss Perkins' informal opinion was given in a letter to Maloy and was made public two hours after the White House press conference. It was in response to a request for a ruling on the right of the employee representatives to accept the Carnegie-Illinois 10 per cent wage increase agreement subject to changes based on costs of living as reported by the Department of Labor index. Maloy and Patterson, like Lewis, have strongly opposed the plan.

Federal License for Industry?

Whatever Washington may do about the steel and general labor situation, the maneuvers of the CIO show that, in laying its unionization drive before the administration, it has attempted to capitalize on its political support of the ad-



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GEARS AND SPEED REDUCERS

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ministration during the recent campaign. The orthodox wing of the A. F. of L. also largely supported the President, and the legislative program it will urge at the Tampa convention will be framed with a view to getting Presidential support. This, of course, will not necessarily reflect conflict with the CIO on this subject since each group largely favors the same program. Already Senator O'Mahoney has anounced that at the forthcoming session of Congress he will reintroduce his bill making it compulsory for industry to take out a Federal license before being permitted to operate.

This is part of the program Major Berry proposed last December at his abortive conference as "coordinator of industry." Known as Berry's "boycotted" conference because representatives of major industries walked out of the conference, every indication is that, despite wheedling words to the contrary, Berry proposes a similar conference next month. Last year such major industries as steel and automotive were not represented at the conference. Machinery and metal-working industry representatives were among the first to bolt the conference when it became known that Berry had in mind a broad program, favored by organized labor, for regimentation of industry, another NRA in modified form. Doubt has been expressed that Berry will get a large attendance at the conference next month, though he claims he has received widespread response accepting the invitation. Since the conference last year Berry has engaged in vigorous attacks on large industries, particularly steel. Such attacks constituted an important part of his political tirades. His Labor's Non-Partisan League has gone on record that it will insist on restoration of an NRA and, in an announcement some time ago, Berry said the Council for Industrial Progress at its December meeting will discuss the "intolerable situation" created by the Supreme Court in its decision killing NRA.

To Consolidate Labor's Gains

Berry, Lewis and Sidney Hillman of the Amalgamated Clothing Workers' Union, at a press conference last week, announced intentions of consolidating the gains of organized labor arising from the Presidential election. Involved in the plan is establishment of the Non-Partisan League on a permanent basis preparatory to engaging in political activity "on its own" beginning with the 1938 Congressional elections. Hillman told of plans for a unionization campaign calling for a general increase in wages in his industry. At the same time David Dubinsky of the International Ladies' Garment Workers Union, joining with Hillman, said his union would back up CIO and made it known he was completing a new NRA plan for his industry. It is believed the Non-Partisan League is preparing to ask constitutional amendments in order to achieve its objectives.

In connection with organized labor intramural quarrel, President Green of the A. F. of L., taking the offensive, sharply attacked Lewis for "rebellion." He predicted collapse of the CIO while the A. F. of L. would stand "like Gibraltar" and "organize the unorganized of America and we are going to organize them into the American Federation of Labor."

International Harvester Co. Union Under Fire

Whether by coincidence or by design, answer to the petition asking Miss Perkins to pass on the

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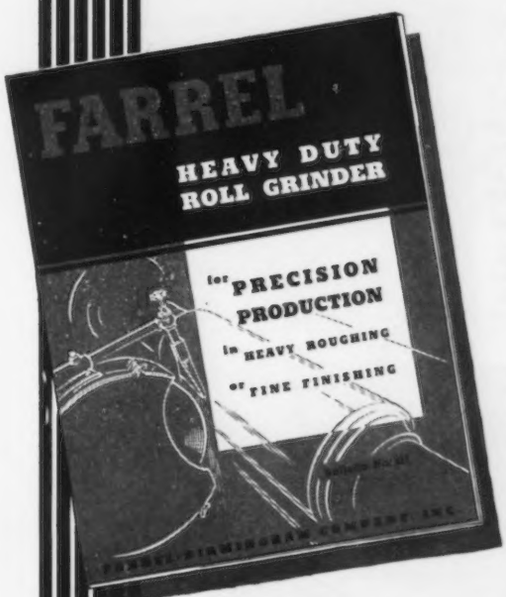
In addition to tabulations giving general specifications and dimensions and weights, the bulletin also describes the standard and optional attachments which can be furnished, and the electrical equipment required.



Thirty-seven illustrations include photographs of different sizes of roll grinders, close-up views of various units and installations of Farrel machines. A typical foundation plan shows how the foundation is constructed.

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legality of the employee representation plan was made public just as the National Labor Relations Board announced an order calling upon the International Harvester Co. to "disestablish" the Harvester Industrial Council Plan as representative of employees at its Fort Wayne, Ind., plant. The Harvester company was a pioneer in the establishment of so-called company unions. They have been considered models and their plan widely copied by other industries. The Fort Wayne council, just held illegal by the NLRB Board, was established in 1927 when it was approved by 96 per cent of the company's 1050 employees.

Complaint against the Fort Wayne Council was made by the United Automobile Workers, a CIO affiliate. The board declared that the Harvester company's council plan as operated contains "only the shadow, not the substance, of collective bargaining." It was charged that the council is entirely "the creature of the company." Passing on the matter of financing, as raised in the Patterson-Maloy petition presented at the White House, the NLRB said it "the Harvester company has financially supported the plan to an extent forbidden by the act, and that the management in other ways has extended its influence and support to the point of domination of a supposedly independent worker organization."

Intimating that it stood ready so far as it is within its power to abolish the council plan entirely, the board significantly said that while the decision dealt only with the Fort Wayne plant of the company, the Harvester Industrial Council plan also exists in the other 14 plants operated by the company in the United States and Canada. The first council plan of the Harvester company was organized in 1919.

Secretary Perkins's Letter

Secretary Perkins's letter to Mr. Maloy follows:

Nov. 13, 1936

My dear Mr. Maloy:

You have submitted to me in your capacity as chairman of the Pittsburgh District Council of the Carnegie-Illinois Steel Corp., a group composed of employees' representatives of the Steel Corporation's plants, a resolution of that council stating its purpose to request from an "appropriate governmental agency" an opinion regarding two questions raised in the resolution.

These questions concern primarily a document purporting to be an agreement between the Carnegie-Illinois Steel Corp. and the various employee representatives of the Steel Corporation's constituent plants, which document provides for a certain wage scale to take effect on Nov. 16, 1936, for one year.

The resolution you submitted specifically raises in Article 3 the question of whether or not the employee representatives have authority, under the employee representation plan in effect between the Steel Corporation and its employees, to bind their fellow-employees whom they represent by signing this agreement which was submitted to them by the Steel Corporation.

An examination of a printed booklet purporting to be a copy of the employee representation plan of a subsidiary of the United States Steel Corporation, which you assure me is identical with the plan in effect in all of the plants, whose employees you represent, indicates that the employee representatives are not authorized by the employees whom they represent to sign any agreement on their behalf which would bind them in any way.

Furthermore, nothing in the plan indicates that agreements between the employee representatives and the Steel Corporation concerning wage scales, written or otherwise, are contemplated.

Although it is not my practice to promulgate formal opinions on questions of this sort, I have occasionally given my informal opinion concerning similar matters in answer to requests from representatives of labor organizations and from individual laborers.

Hence, it is my opinion in answer to your request, that if there are no amendments to this employee representative plan, and I am unaware of any such amendments, providing for such authority on the part of the employee representatives to negotiate and execute agreements of this sort on behalf of their fellow-employees, and if no actual authority has been given by the employees whom they represent to these employee representatives to negotiate and execute agreements of this sort on their behalf, the employee representatives are not authorized under the employee representation plan to enter into or sign on behalf of their fellow-workers an agreement concerning wage scales.

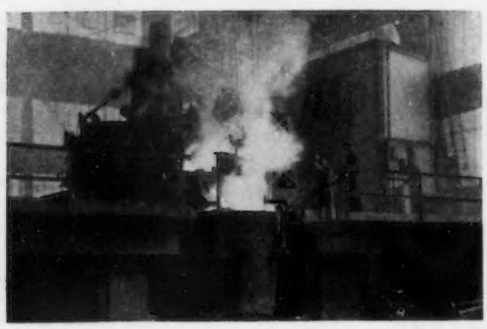
Article 4 of the resolution you submitted raises the question of the legality of the entire employee representation plan of the United States Steel Corp. and its subsidiaries, including the Carnegie-Illinois Steel Corp., in light of

THE STARTING POINT *of*

NF

FORGINGS

CARBON-ALLOY AND SPECIAL BASIC ELECTRIC STEELS



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existing Federal legislation, presumably of the National Labor Relations Act.

It is resolved in this article that you request "an appropriate Government agency" to review the entire employee representation plan of the United States Steel Corp. and its subsidiaries in the light of existing Federal legislation safeguarding the right of the workers to organize into associations of their own selection for collective bargaining purposes.

Inasmuch as your inquiry in Article 4 of the resolution involves issues now in litigation before the Supreme Court of the United States, and inasmuch as the National Labor Relations Board and not the United States Department of Labor is the "appropriate Governmental agency" to conduct an investigation and inquiry of the sort indicated, particularly as such an investigation would require hearings over a considerable period of time in order to bring forth facts and evidence not at present available, it is not within my province to give an opinion on this matter.

Your proper recourse would be to invoke the powers of the National Labor Relations Board, pursuant to the procedure set forth in the National Labor Relations Act, which provides the facilities for the hearings and investigations necessary for an adequate reply to your question asked in Article 4 of the resolution.

"ONE-TWO-THREE—HEAVE!"

SURE, you can use strong backs to tote heavy hunks of steel around your plant. And for that matter, old hand-operated equipment will still lick the law of gravity. But for the speed and economy that will cut your material handling costs, look to 1936 methods.

P&H engineers have experience with hundreds of different handling problems in all kinds of plants. They have the answers that save you money. That's why up-and-coming production men call in a P&H engineer occasionally . . . to see what's new in material handling methods and equipment. If any P&H engineer can't show you how to cut your costs, he'll frankly tell you so. There's no obligation. Why not ask one to call? Or write for Bulletin RH-2.

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Further Protests Filed Against Changes in Freight Rates

WASHINGTON, Nov. 17—Protests against proposed freight rate increases on iron ore constitute the chief objection coming from iron and steel manufacturers to the railroads' petition to readjust the freight rate structure upon the expiration on Dec. 31 of existing emergency charges. Objection also is being made to proposed increased rates on coal and coke while to a lesser degree there is protest against increased rates on iron and steel products.

Such makers as the Republic Steel Corp., the Jones & Laughlin Steel Corp., and the Youngstown Sheet & Tube Co. have joined in protests to the Interstate Commerce Commission against the proposal to increase ore rates by 6c per gross ton from mines to upper Lake ports and 6c per gross ton from lower Lake ports to interior rail destinations. The Republic Steel Corp. also has protested against the proposal of the railroads to increase the rate on ex-river coal from Conway and Colona, Pa., to Niles and Warren, Ohio, from 90c to $1 per gross ton while leaving the rate from these sources to Youngstown at 90c.

The protests against increased rates on iron ore are similar in their nature, and emphasize the increased cost that would result to the steel manufacturers from higher rates on raw commodities. Contention also is made in the J & L petition that the proposed increased rates on iron ore would impair the rate relationship, particularly on long-haul traffic. The petition estimates that the Jones & Laughlin Corp.'s added cost for freight charges in round figures would be $1,000,000 per year while the Youngstown Sheet & Tube Co., estimates the added cost to it would be $700,000 per year. Both say these charges would be in excess of the present emergency

charges. The Jones & Laughlin petition says they would exceed by about $250,000 present charges for it. This is computed on all traffic, it is pointed out, but the increases on raw commodities would account for most of the increase.

Protest has been made by the National Association of Waste Material Dealers, Inc., which told the commission that if the railroad petition is granted the waste material industry will be forced to ask for suspension of the ensuing rates if the present rates are to be maintained. It was declared that the movement of scrap metals, etc., is dependent on reasonably low freight rates.

Trade With Canada Has Gained Under Reciprocal Tariff Agreement

WASHINGTON, Nov. 17—Canadian imports from the United States of iron and steel products affected by the Canadian-American reciprocal tariff agreement, including machinery and vehicles, aggregated $42,900,000 in the first six months of 1936, an increase of $9,200,000 over the corresponding period of 1935, according to an analysis of the agreement prepared by the State Department. The agreement came into operation Jan. 1, 1936. The analysis is the first of a series on reciprocal tariff agreements.

In the machinery group, Canadian imports from the United States of farm implements and farm machinery, on practically all of which the duty was cut in half by the agreement and in some cases subsequently further lowered, accounted for an increase of $424,000.

The statement says that the significant change in the sales to Canada of automotive products, following the reductions in duties and other changes granted the United States, was the substantial increase in sales of complete motor vehicles and chassis of American manufacture and of parts for replacement, each more than offsetting the decline in the sales of engines and other parts for assembly. Canadian importations from the United States of complete vehicles and chassis increased in value during January-June, 1936, by $2,100,000 over the corresponding period of last year.

Detailed figures were available only for the first half of the current year, but general totals for the first nine months of 1936 showed that Canadian imports

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HARD working. Serious. Thorough as they come — this Gustaf! One of the old school who looks on his work not as just a job, but as his trade — his profession — which he learned from the bottom up. Given the best there is to work with, Gustaf will top them all!

Here's where you come in, for tools alone won't do the trick. Whether machines are of the latest design or not, correct cutting oils (and their correct application, of course) are *today* increasing speeds, reducing the number of tool grinds, and cutting down rejects for hundreds of modern-minded plants — getting the kind of results which the work of men like Gustaf really deserves.

A Standard Oil engineer is ready to see if his experience in every type of metal-working operation can help you as it has many others. Why not give your men the advantage of this free service? You may be surprised at the difference in production that even *one* improved lubrication practice can make! And can't you see the slow, broad grin on Gustaf's face as he shows you perfect finished work and an empty reject bucket?

Write for booklets covering lubrication problems in your plant. (List subjects or types of machinery in which you are most interested.)

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CORRECT LUBRICATION

from the United States amounted to $266,000,000, an increase of $33,000,000 over the corresponding months of 1935. United States imports from Canada during the same period amounted to $262,000,000, an increase of $58,000,000 over last year.

The entire analysis shows increased trade between the United States and Canada during the first six months of the present year when compared with the like period of last year, though it is naturally to be assumed that a portion of the gain was due to general recovery in international trade. The analysis took no account of this improvement.

The majority of the products in the iron and steel group, machinery and automotive group, the statement said, were directly benefited by the trade agreement, either in the form of duty reductions, which affected most of the group, or an assurance that the existing duties and charges would not be increased.

In the heavy iron and steel group, structural iron and steel, on which the existing duty of $3 per ton was bound against increase, made the largest gain, $255,000, an instance where the gain was not due to a lowered duty. Of the heavy products accorded duty reductions, moderate increases were recorded for steel rails and for sheets, plates and hoops. Imports from the United States of castings and forgings, on which the duty was also reduced, decreased by $234,000.

Imports of lighter weight iron and steel products, including hardware, from the United States, on which duties were reduced, increased $209,000. Steel ball and roller bearings, on which the duty was reduced about one-quarter, made the largest gain in this group, increasing $165,000, while less important increases were registered for pipes, tubes and fittings and for hardware of various types.

Gains of $173,000 for agricultural implements and $116,000 for threshing machinery were recorded, with smaller increases shown for dairying and harvesting machinery.

Industrial machinery sales which exceed in value by a large margin American sales of other types of machinery to Canada, increased by $3,100,000.

The greatest trade gains in industrial machinery were made in the following classifications:

Metalworking machinery	$492,000
Textile machinery	382,000
Printing machinery	283,000
Mining and metallurgical machinery	169,000
Refrigerating and ice-making machines	129,000
Paper and pulp mill machinery	113,000
Power shovels	108,000

Metal Window Manufacturers Cited For Alleged Fixing of Prices

WASHINGTON, Nov. 17.—Another of a series of complaints alleging price fixing in the metalworking fields, just announced by the Federal Trade Commission, is directed against 19 manufacturers of metal window products and the Metal Window Institute, Washington, representing virtually the entire industry. The complaint alleges violation of Section 5 of the Federal Trade Commission Act through maintaining a price-fixing combination, the purpose of which, the complaint charges, is to restrain, monopolize and eliminate competition in the sale of metal window products.

For the purpose of making their combination effective, the corporate respondents, the complaint alleges, engaged in the following practices:

1. Acting through their trade association and its predecessor, they compiled a gross or basic price book which gives the price, or the formula by which such price may be determined, for every product of the industry.

2. Filed with their trade association a schedule of the discounts from the prices established by their price book at which they sold their products, and agreed that the trade association could, and did, convey to its members information contained in the schedule of discounts so filed.

3. Maintained and adhered to a schedule of uniform discounts, the effect of which was to establish fixed, uniform, minimum prices.

4. Agreed not to sell their products for less than the fixed, uniform, minimum prices established without notifying each other in advance that a sale was to be made at less than the minimum agreed upon.

5. Fixed uniform terms and conditions that were a part of all sales made, including, but without limitation, mandatory erection, time for delivery, and freight allowance.

6. Submitted all estimates of bids on a project in a given area to one of their clearing bureaus,

(CONCLUDED ON PAGE 84)

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Morse Kelpo Free-Wheeling clutches are constructed with individually sprung cams, gear actuated to provide instant engagement when speeds synchronize. Alternate power units drive and release with perfect smoothness without backlash.

Sizes 1½ H.P. to 100 H.P. (per 100 R. P. M.) with FLEXIBLE COUPLINGS.

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Industrial Apprenticeship—1936 Model

(CONTINUED FROM PAGE 43)

had at least one year each in mathematics, chemistry, mechanical drawing and machine shop practice.

These were chosen from a list of 75 recommended by the technical high schools of Cleveland from which they were graduated early in the year. The applicants already had had fundamental training in the use of basic machine tools and they were given a rigid examination in mathematics, physics, chemistry and were also subjected to interviews to determine their character, personality and common sense. Enrollment is limited to applicants between the ages of 17 and 21. The training of apprentices in only limited number does not minimize the chances of present qualified employees for promotion and the company will continue to fill desirable positions on the basis of merit.

In order that the fitness of the apprentice for work in the shop can be fairly judged, the first 1040 hours or six months of the course is considered as a trial term which the company may terminate at any time before the expiration of that period if it is found that the candidate is not qualified for the work. At the expiration of the trial term if the applicant is found to be satisfactory he is enrolled as a regular student. His contract is signed and the 1040 hours which he has already completed are applied on the total number of hours required for graduation. Each student upon satisfactorily completing the four terms is to receive from the company a gratuity of $100, a graduate pin and a diploma signed by officers of the company.

During the period of training written reports of the workmanship, fitness and deportment of each student, together with recommendations for future work, are to be made to the manager of personnel on the first day of each quarter. Not only is the student expected to perform diligent work in the shop, but also to manifest ambition by spending leisure time at home in study and in the reading of engineering papers and other literature that will enable him to master theoretical as well as practical problems. The company reserves the right to terminate the agreement with any student for nonconformity to the rules and regulations of the shop, lack of industry or capacity, indifference to duties or improper conduct in and out of the shop.

A Comprehensive Program

A very comprehensive program has been prepared for the portion of the time that the apprentice will spend in classroom work during his four-year training period. Instruction in machine shop practice during the first year is divided into two classifications, one covering hand-operated and the other power-driven tools. There will also be instruction in production methods, the layout of work, etc. During the course on tool and machine design in the second year subjects taught will be: turret and engine lathe tooling, design of chuck jaws, boring tools, facing tools, resisting tools, reamer and floating holders, cross slide tools, tapered and curved surfaces and fixtures for grinding. The course in metallurgy will take up raw materials, blast furnace operations, grades of pig iron and their physical properties. Under a subheading of foundry, gray iron, malleable iron and steel castings

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will be considered. Various methods of manufacturing steel and its mechanical and heat treatment will be one subject and others will be devoted to steel alloys, wrought iron and aluminum. The factory management course during the third year will include internal organization, selection of equipment, power, internal transportation, plant layout, construction of a factory building and maintenance and upkeep of plant and routing work. This course also will take in such subjects as time studies, manufacturing standards and their relation to fatigue, planning and scheduling production, buying material, inspection, stocking and shipping, factory records and planning and cost departments.

The metallurgical laboratory course will consist primarily of polishing various steel samples and examining them under a microscope. The chemical laboratory course will consist of lectures and laboratory work.

During the business administration course in the fourth year lectures will be given on such topics as production and its control, personnel and effect of human relationship on business, marketing, financing, business, business risks and business leadership.

The course of lectures also provided for the fourth year will be given by various executives of the Thompson company and other manufacturers. Considerable time will be spent visiting other manufacturing plants in Cleveland and elsewhere.

Report cards on which the students are graded both for their shop and class work are made out monthly by the foreman who sends them to the director of personnel and he in turn sends the cards to the parents. A consolidated record of the student's work with grades recorded for work on each type of machine and for class work that he does is compiled on a large card and these records are filed in the office. Supplementing this work in the plant the boys have organized a club partly for social purposes and partly for reviewing technical articles and discussions.

The training program is under the direction of John R. Cox, director of manufacturing, and R. L. Livingstone, director of personnel. Instruction in machine shop practice is being given by Christian Sorenson, the company's industrial engineer and on mechanical drawing by Norman Hoertz, research engineer. A foremen's training course is also carried on in the plant. This is conducted under the auspices of a foremen's club of which the 80 foremen are members. The club meets once a month at a hotel where dinner paid for by the company is served. A steering committee meets in advance and outlines a program for each meeting. The speaker is an officer of the company or an outsider. Questions are answered after the talk. The object of the club is to broaden the foremen and give them a wider perspective. Subjects discussed include general company policy, business organization and administration. No shop problems are taken up. These are discussed at a regular weekly conference of the foremen.

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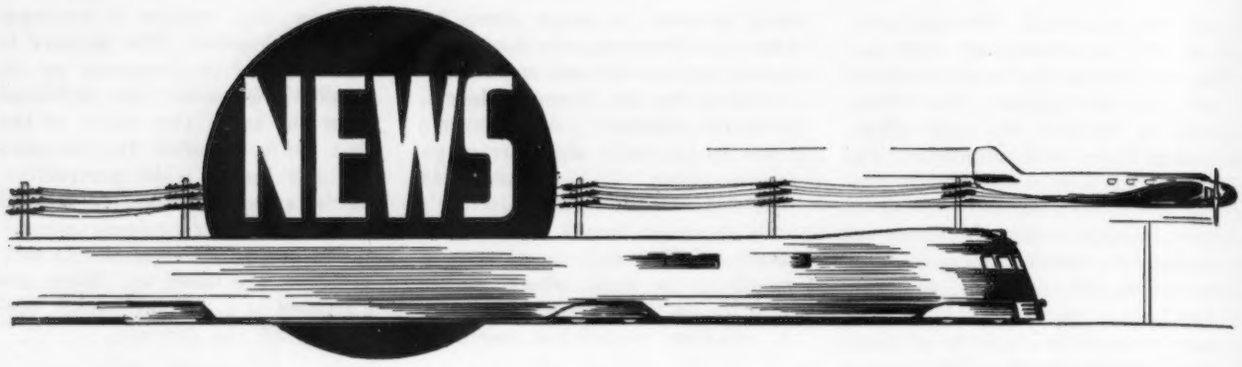

All Carnegie-Illinois Workers to Get Pay Rise Regardless of Contract

ALL wage earners of the Carnegie-Illinois Steel Corp. will receive the recently announced pay increase regardless of whether their representatives signed the contract presented by the company. An announcement to all employees posted on bulletin boards last Monday, stated:

"The proposed wage increase, coupled with the adjustment of occupational rates and based upon the cost of living formula which you and the management have been considering for some time, has received the hearty approval of a great majority of the employees of this company and, therefore, will be the policy of the management in all plants of the company, effective Monday, Nov. 16, for a period of one year."

This announcement ended the uncertainty as to whether the "hold-outs" would receive the contemplated wage increase. The plants which have not signed the contract and whose representatives are, in the majority, pro-Lewis adherents, are Duquesne works, Edgar Thomson works, Vandergrift sheet works, and the Farrell-Mercer plant and the Youngstown district. Workers in these plants total approximately 16,000. Two Chicago works of the Carnegie-Illinois Steel Corp. which have not signed the contract are the Gary tin and the Gary steel works.

Those representatives in the Carnegie-Illinois Steel Corp. who have the backing of the Steel Workers Organizing Committee have been doing their best to embarrass both the company and those employees who had signed the wage contract on behalf of their constituents.

Elmer J. Maloy, pro-Lewis sympathizer, and head of the Carnegie-Illinois employees' general council, last week called on Secretary of Labor Frances Perkins, in an attempt to get a ruling on the company's wage contract. He also appealed to President Roosevelt and this week has been criticized by some of his colleagues for his "unauthorized and unjustified" trip to Washington. One of them accused him of "grandstanding."

The final outcome of employee feeling regarding the much-talked-about wage contract will probably be forthcoming in future meetings of the employees' general council, composed of 34 Carnegie-Illinois employee representatives from the company's 17 plants in the Pittsburgh-Youngstown district.

Meanwhile, other industries closely akin to the larger steel companies, have announced wage increases, averaging around 10 per cent. Firth-Sterling Steel Co., McKeesport, Pa., has raised wages approximately 10 per cent and has boosted common labor to 58c. per hr. United Engineering & Foundry Co., Pittsburgh, last week raised wages on an average of 11 per cent, with common labor being increased approximately 20 per cent. The minimum labor rate was stepped up from 44c. to 53c. an hr. and all other rates were up 7c. an hr. Increases for salaried employees at this company are under consideration. Mesta Machine Co., Homestead, Pa., announced on Monday that its 3000 employees would receive wage increases averaging 10 per cent. Pittsburgh Steel Co., late last week, granted wage increases averaging 10 per cent. Common labor was raised by the same amount as that announced by other steel companies, making the prevailing common labor rate 52½c. an hr. Employees in the higher wage brackets have been increased slightly less than 10 per cent. White collar workers earning less than $3,600 a year will be granted wage increase consideration. Another plant to join the procession was the Page Steel & Wire Co., Monessen, Pa., which announced a 10 per cent wage increase, effective Nov. 16.

Salaried workers at Carnegie-Illinois Steel Corp. will receive pay increases averaging 7 to 9 per cent.

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$0.033	Machining Cost
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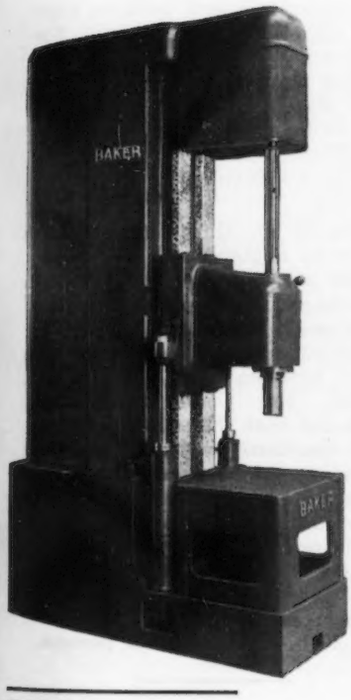

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Unemployment in September was 8,975,000 Says Conference Board

THE total number of unemployed workers in September, 1936, was 8,975,000, according to new estimates of the National Industrial Conference Board. This compares with a maximum of 15,939,000 unemployed in March, 1933, and an average total of 1,132,000 unemployed in 1929.

Employment in all types of enterprise in the United States in September, 1936, was 43,747,000 workers, an increase of 9,116,000 workers as compared with the depression low of 34,631,000 employed in March, 1933. The number of employed workers in September was 3,409,000, or 7 per cent, below the average of 47,156,000 workers employed in 1929.

Manufacturing industry has contributed most to reemployment, with an advance of 3,033,000 workers from March, 1933, to September, 1936. Agriculture was next in importance with a total of 1,488,000 reemployed workers. The construction industry has reemployed 1,358,000 workers; the service industries, 1,288,000, and trade, distribution, and finance, 1,142,000.

"Industry" in general, including manufacturing, extraction of minerals, construction, transportation, and public utilities, contributed 4,913,000 reemployed workers, or 54 per cent of total reemployment. Non-agricultural enterprises in general accounted for 7,628,000 workers, or more than 83 per cent of total increase in employment.

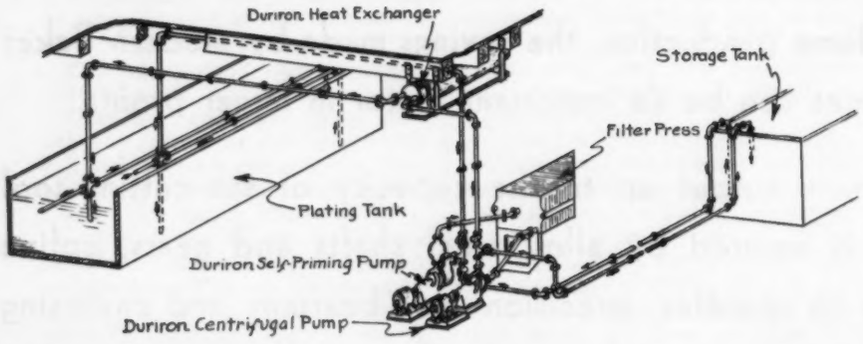
The number of workers employed in agriculture was 500,000, or nearly 5 per cent greater in September, 1936, than in 1929. Employment in the service industries and also in trade, distribution, and finance, in September, stood at 96 per cent of the 1929 level. Manufacturing employment stood at 87 per cent; construction at 83 per cent; the public utilities at 81 per cent; transportation at 77 per cent; extraction of minerals at 67 per cent, and forestry and fishing at 59 per cent.

The task of reducing unemployment, the Conference Board points out, is not alone a problem of reabsorbing displaced workers. It also involves the placement of new arrivals into the nation's labor supply. Since 1929, about 4,434,000 potential new workers have been added to the country's labor force. The increase in new workers since 1933 approximates 2,000,000. The addition of these new potential workers accounts for the fact that since March, 1933, unemployment has declined only 7,000,000, although there has been a reabsorption in employment of 9,000,000 workers.

Roughly, one-third of the unemployed in September, 1936, or 3,317,000 persons, were engaged by Governmental agencies in emergency work. During 1936 the total number of workers so employed has varied between 3,200,000 and 3,700,000. The Conference Board points out that the significant fact about the Government labor force is that its size roughly approximates the growth of new workers in the entire labor force. Whereas the entire labor force increased by 3,589,000 workers from March, 1930, to March, 1936, the number of Government workers in the latter month totaled 3,684,000 persons.

Purchasing Agents Association of New York will hold annual exhibition of members' products at Hotel Pennsylvania, New York, on Nov. 17 and 18. The exhibition is open to the public by presentation of tickets available from the association's members or its headquarters at 120 Broadway, New York.

For handling plating solutions

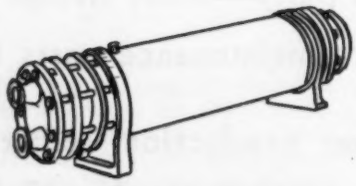


The schematic drawing of a heating and filtering system for plating solutions is a layout similar to those used by many companies with plating departments.

Duriron pumps pull the solution from the plating tank, pass it through the filter, into the heat exchanger where it is brought up to temperature and returned to the tank.

The plating solution is always clean and always at the right temperature—two important things in any plating process—and both jobs are done continuously and automatically.

Reduce your rejects . . . lower your costs . . . modernize your plating methods . . . profits depend upon using money-saving methods, discarding the old.



The Duriron Heat Exchanger will handle from 10 to 50 gpm. and is recommended for any heating job where dilution is undesirable and where close temperature control is essential, as in plating. Send for Bulletin 173—free.

Today isn't too soon to start - - write now for more detailed information.

THE DURIRON COMPANY, Inc.
438 N. Findlay St. **Dayton, Ohio**

Large Refrigerator Order Placed

WESTINGHOUSE ELECTRIC & MFG. CO. has been awarded an order for 16,697 electric refrigerators, the largest single order of its kind ever placed and valued at over $1,000,000. The order was placed by Public Works Administrator, Harold L. Ickes, and the refrigerators are to be used in 34 of the PWA slum clearance and low-rent housing projects located in 26 cities throughout the country where electric rates make this type of refrigerator more economical.

Deliveries to project sites and installations in kitchens is called for over a nine-month period from January to October, 1937, which will permit the maintaining of factory production in otherwise off-peak production period. This procedure will result in more continuous employment. These refrigerators will be built at the Westinghouse plants in Mansfield, Ohio, and Springfield, Mass., and are of standard 4 cu. ft. cabinet designs.

Ludlum Changes Silcrome Designations

LUDLUM STEEL CO., Watervliet, N. Y., is changing the grade designations of part of its chrome nickel Silcrome series so that in the future its stainless grades will be designated by numbers indicating as closely as possible their composition.

The following changes have been announced:

Old Designation	New Designation
Silcrome KA2	Silcrome 18-8
Silcrome KA2-S	Silcrome 18-8-S
Silcrome KA2-T	Silcrome 18-8-T
Silcrome KA2-C	Silcrome 18-8-C
Silcrome KA2-MS	Silcrome 18-8-M
Silcrome KA2-EZ	Silcrome 18-8-EZ

Designations of grades not listed above remain unchanged.

Armco Plants Hold "Open House"

RECENT "open-house" activities at the Middletown, Ohio, and Ashland, Ky., plants of the American Rolling Mill Co. were attended by more than 24,000 persons, according to a statement from the company. The visiting days were part of Armco's plan to have the families of the employees, the business and professional men and all residents of communities in which Armco operates better understand the wage earner's jobs and working conditions. Superintendents, foremen and employee representatives acted as "hosts" and planned and arranged the exhibits, which showed the various products of each department of the plant and revealed their progress from iron ore and scrap through the mill into their complete forms.

Gray Iron Founders To Enlarge Membership

GRAY IRON FOUNDERS' SOCIETY, INC., 1010 Public Square Building, Cleveland, has amended its by-laws to provide for memberships representing manufacturing foundries, the organization heretofore having confined its membership to jobbing foundries.

DROP FORGED STEEL RIVETLESS CHAIN
6" I-BEAM MONOVEYOR TROLLEY
MONOVEYOR DRIVE UNITS
MBS AUTOMATIC TRANSFER
TROLLEY CONVEYOR HANDBOOK
Just off the Press
This new 94 page engineers' handbook on power driven overhead Trolley Conveyors, with 250 illustrations, is the most comprehensive work thus far published on this subject—and it is right up-to-date.
Some of the subjects covered are:
Design and Layout • Proper Selection of Chains • Trolleys and Wheels • Track • Standard Drive Units • Sprockets and Shear Devices • Take-Ups • Roller Turns • Traction Wheels • Automatic Oilers • Hooks and Carriers • Guards and Housings • Automatic Transfer of Loads from One Conveyor to Another • Special Equipment • Monorail Systems.
Mechanical Handling Systems Inc.
4600 NANCY AVE. • DETROIT, MICH., U. S. A.
Write
ON YOUR OWN LETTERHEAD
FOR YOUR COPY

	Net Income					*Earnings per Common Share	
	Third Quarter		Second Quarter	Nine Months		Nine Months	
	1936	1935	1936	1936	1935	1936	1935
Acme Steel Co.	$538,847	$384,479	$513,774	$1,444,474	$1,319,817	$4.40	$4.02
Allegheny Steel Co.	349,276	246,009	610,805	1,297,045	746,747	1.50	0.94
American Rolling Mill Co.	2,063,603	552,137	1,561,161	4,368,668	3,011,140	1.91	1.71
Bethlehem Steel Corp.	4,575,058	701,616	3,431,391	8,609,514	1,895,227	1.01	*d*0.94
Eastern Rolling Mill	13,093	*d*68,760	*d*12,628	8,985	*d*175,423	0.04	*d*0.84
Granite City Steel Co.	84,633	102,824	44,226	190,075	415,198	0.50	1.63
Gulf States Steel Co.	201,314	58,433	110,545	408,788	21,919	1.54	*d*0.42
Inland Steel Co.	3,788,199	1,810,203	3,298,191	9,021,022	6,668,509	6.02	5.56
Jones & Laughlin Steel Corp.	1,870,866	233,914	1,115,733	2,053,320	*d*516,463	*d*1.79	*d*6.24
Keystone Steel & Wire Co.	†225,705	†382,049	‡	‡	‡	†0.30	†0.50
Ludlum Steel Co.	270,968	101,948	271,370	705,350	447,483	1.30	1.15
National Steel Corp.	3,359,705	2,287,764	2,805,570	8,542,429	8,846,566	3.96	4.10
Otis Steel Co.	495,110	*d*27,367	751,674	1,395,460	1,360,488	0.94	0.90
Republic Steel Corp.	3,311,555	507,731	2,661,062	6,333,649	3,264,295	1.10	0.29
Sharon Steel Corp.	342,418	‡	268,336	823,370	‡	1.95	‡
Superior Steel Corp.	118,010	*d*39,206	58,726	205,824	*d*32,525	1.81	*d*0.29
United States Steel Corp.	13,636,177	*d*1,305,205	12,862,423	29,874,904	*d*4,241,499	1.26	*d*2.66
Wheeling Steel Corp.	1,186,660	648,597	871,277	2,068,859	2,251,468	0.91	1.39
Youngstown Sheet & Tube Co.	2,359,998	574,799	2,588,089	6,845,386	103,788	5.27	*d*0.43

* On shares outstanding. † First quarter of fiscal year ending June 30. ‡ Not available. *d* Deficit.

Steel Profits This Year 3¼ Times Those of Same Period Last Year

By AUGUSTUS SLATER
Young Management Corp.

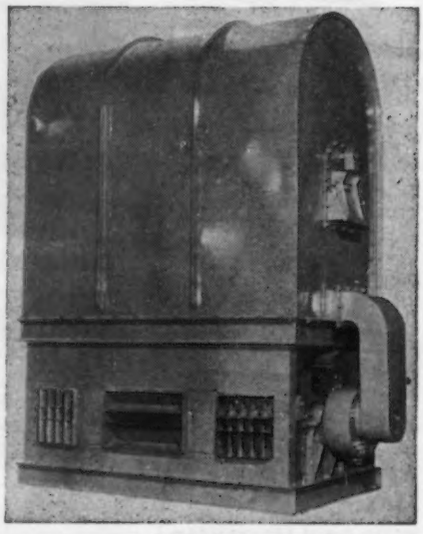
CONTINUATION of the recovery momentum, especially in its effect upon demand for heavy steel products used in capital goods projects, made encouraging reading for stockholders of the steel producing companies. Net income of 17 principal steel companies totaled $38,200,000 for the three months ended Sept. 30 last, compared with a total of $33,500,000 in the preceding quarter and only $6,800,000 for the third quarter last year. Profit for the nine months, amounting to $83,400,000 was over three and one-quarter times the net of $25,400,000 earned in the same period in 1935.

Larger profits have accrued to the industry owing to higher operations attendant very largely upon capital goods revival.

Lee Direct Fired Unit Heaters

For Steel Mill and Steel Warehouse Heating

Economical Operation — High Efficiency — Durability — No Stand-by Losses — No Boiler Plant — Installation and Maintenance Costs Reduced to a Minimum — Flexibility of Operation — Self Contained — Automatically controlled — Unit Adaptable to Space Heating or Spot Heating by Means of Duct System — Portable. Designed for firing with oil, gas, coal, coke, or coke breeze, this heater can be either manually or automatically controlled. Cold air is taken in along the floor and hot air delivery can be either at floor level or at any distance above the floor. Built in large capacities. Delivers dry hot air for warehouses. No steam leaks.



Write to Dept. A.B. for bulletin containing detailed information.

Patent applied for

DRAVO-DOYLE COMPANY, Pittsburgh, Pa.

Mechanized Foundry Discussed at Meeting

THE November meeting and dinner of the New England Foundrymen's Association was held Friday evening, Nov. 13, at the Engineers' Club. William P. Laytham, president of William P. Laytham & Sons Co., Paterson, N. J., and Michael McGuire, foundry consultant for George F. Pettinos Co., Philadelphia, were the principal speakers. Their subject was "The Mechanized Foundry."

Both speakers discussed the benefits that had been derived from mechanizing foundries, bringing them into modern condition, which resulted in much better and faster work than could be possible under the old systems. They urged that, to keep abreast of the times, all foundrymen should acquaint themselves with the possibilities, while at the same time they would be coming into line for better results by adopting some of the modern developments as soon as possible.

Standard Oil Co. of Indiana has ordered from the Manitowoc Ship Building Corp., Manitowoc, Wis., a 465-ft. oil tanker of 6500 deadweight tons.

Armco Laboratory of Unusual Construction

PORCELAIN enamel, stainless steel and glass block will completely supplant conventional building materials in the new research laboratories just entering construction for the American Rolling Mill Co. at Middletown, Ohio. The structure, designed and to be erected by the Austin Co., utilizes new continuous steel mill products and structural glass to achieve color, ideal working conditions and architectural distinction at minimum expense.

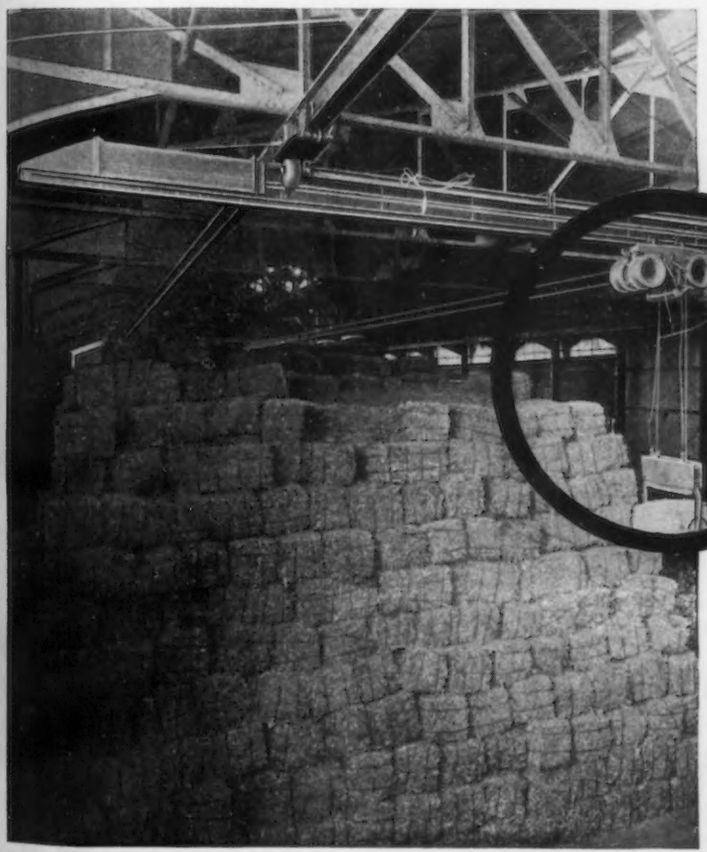
Its cost will be approximately $260,000, exclusive of equipment, whereas a multiple story building of equal floor space but of conventional construction would cost about $400,000, the announcement said. Charles R. Hook, president of the company, stated: "This building will demonstrate the full force which low-priced sheet and strip steel can exert in reviving construction activities."

Fair Committee to Make Bond Offering

A CAMPAIGN to dispose of debentures amounting to $27,829,500 among all concerns doing business in Greater New York to finance the New York World's Fair will be started in a few weeks, according to Harvey D. Gibson, president Manufacturers Trust Co. and chairman of the finance committee of the fair. Richard Whitney, of Richard Whitney & Co., and former president of the New York Stock Exchange, is chairman of the bond sales committee.

Sponsors of the fair have estimated that New York will benefit to the extent of more than $1,000,000,000 in increased business.

Authority to reorganize under Section 77-B of the bankruptcy act was granted the Woodward Iron Co. on Nov. 7 by Judge David J. Davis of the U. S. District Court at Birmingham.



American MonoTractor drives this 62 ft. MonoRail crane over a long area. All movements of crane bridge, hoists (vertical and horizontal) and electrically operated grab are controlled from cab.

MONORAIL CRANES move quickly!

Hand operated or motor driven American MonoRail cranes travel quickly and serve large areas permitting high piling and economical transportation of heavy loads. Specialized experience enables our engineers to apply low-cost, mobile units to meet your requirements up to 5 ton capacity. Write for complete catalogs.

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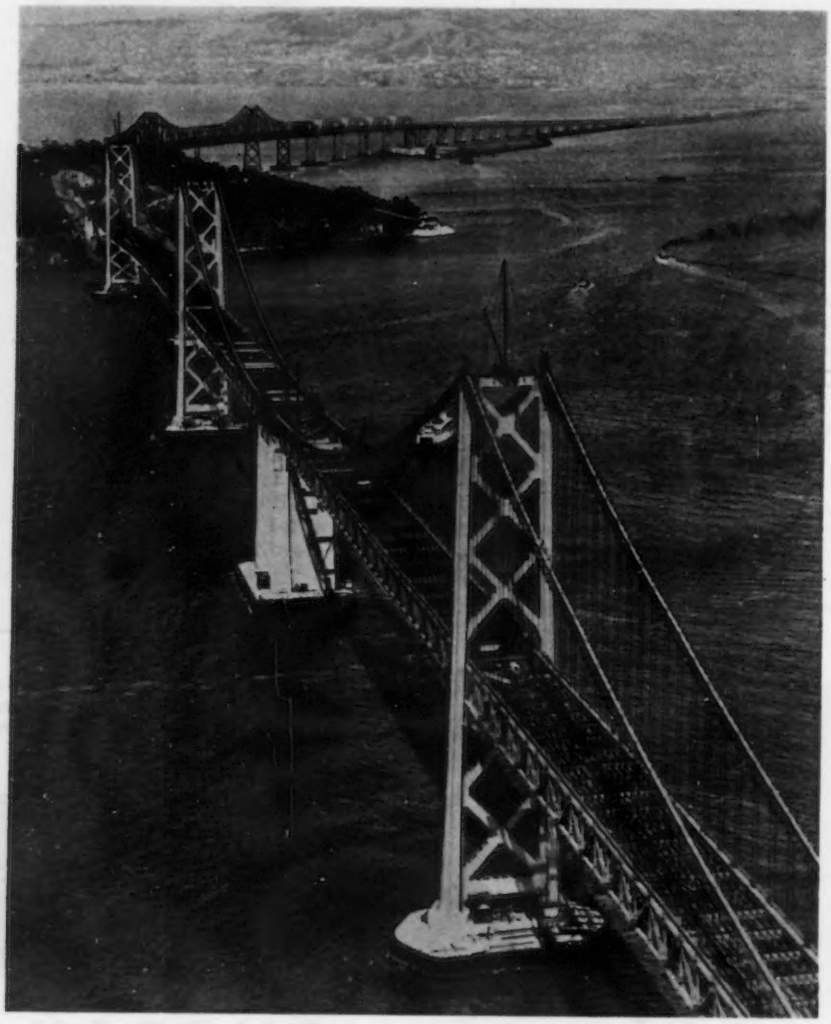
13103 Athens Ave., Cleveland, O.

San Francisco-Oakland Bridge a Gigantic Achievement

Cost $77,600,000, Took 200,000 Tons of Steel



ONE of the most gigantic engineering achievements of all time was completed last week, with the opening to traffic of the San Francisco-Oakland Bay bridge. Begun July 9, 1933 and finished on schedule, this feat will stand unsurpassed for a thousand years, many experts believe, because there remains in the world today no larger body of unspanned water where traffic is likely to justify the cost of building such a structure.

In enumerating the details of the construction of this bridge, only superlatives seem justifiable since it is the greatest bridge in world for its cost, length, quantities of steel and concrete, weight, depth and number of piers, the bore of its island tunnel, and the versatility of its engineering.

The greatness of the bridge may be attributed to several extraordinary factors, among which are: its 51 piers, six of which are deeper than any others in the world; its total length of 8¼ miles, 4½ miles of which are over water; its 52 x 65 ft. bore tunnel through Yerba Buena Island; its 200,000 tons of steel and 1,000,000 cu. yd. of concrete; its 1400-ft. double deck and 25,400,000 lb. cantilever span; and the Moran-Purcell caisson which has set a new engineering frontier in foundation building. It is also the world's costliest bridge, $77,600,000 having been expended for its erection. For variety of engineering problems the bridge has no equal, since the problems incurred by deep water, mud and quicksand bottom, tides,

No. 442 Motor Driven. Range: ⅛ in. to 4 in.

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Revolving Head Type

Over 54 years specializing in this class of machines. Light weight, small floor space, cuts bent pipe, low cost.

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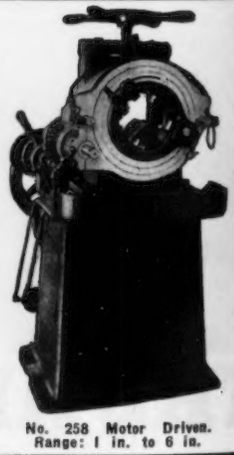


No. 258 Motor Driven. Range: ⅛ in. to 6 in.

winds, tunneling through rock, the huge cantilever structure, and the giant suspension span, all were faced and conquered.

The general contract for the work was placed with Columbia Steel Co., Pacific Coast subsidiary of the United States Steel Corp. The major job of fabricating and erecting the superstructure, including spinning the cables, was done by American Bridge Co., another United States Steel subsidiary.

Other United States Steel subsidiaries and the part they played in the work are: Carnegie-Illinois Steel Corp., plain steel shapes and plates; American Steel & Wire Co., cable wire and suspender wire ropes; and various materials and supplies from Cyclone Fence Co., Federal Shipbuilding & Dry Dock Co., National Tube Co., Tennessee Coal, Iron & Railroad Co. and Lorain Steel Co.

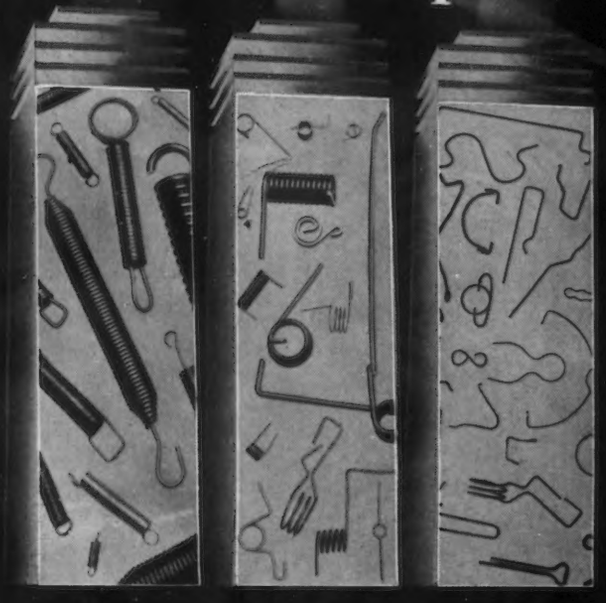
The towers over which the suspension cables are hung range in height from 470 ft. to 515 ft. above water. They are built of several thicknesses of 1⅛ in. steel plates riveted together. Each tower contains about 5000 tons of steel and 110,000 field rivets.

The two cables stretching over the towers and supporting the bridge each contain 17,464 wires about as thick as a lead pencil. These cables are 28¾ in. thick and weigh a ton for every foot. This wire has a tensile strength of 231,000 lb. per sq. in., and with the bridge in use, each cable will exert an average pull of 40,000,000 lb. on the anchorages.

Maximum clearance between bridge and water is 216 ft. Traffic will flow over the bridge along two decks, each 60 ft. wide, one above the other. The upper deck has six lanes for automobiles, while the lower provides three lanes for trucks and buses in addition to two electric railway tracks. The top deck can be crossed annually by 24,000,000 cars and 6,000,000 trucks and buses can cross the lower one without congestion. Loads up to 40-ton trucks and 70-ton interurban cars are provided for, as the bridge will carry 7000 lb. live load per linear foot.

At a dinner meeting Wednesday night in Philadelphia at the Engineers' Club, the Philadelphia section of the American Society of Civil Engineers heard an address by C. F. Goodrich, chief engineer, American Bridge Co. who was in intimate touch with the construction of the bridge from its inception. His talk was illustrated by sound motion pictures and lantern slides of the bridge and its construction. A discussion after this address was led by George F. Beggs, professor of civil engineering, Princeton

WIRE SPRINGS ...
and specialties



all kinds
all sizes
all metals

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Overhead Traveling Cranes
1 TO 450 TONS CAPACITY

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MOST COMPREHENSIVE LINE OF CRANES & HOISTS

The Best Shear Blade You Can Buy Carries This Mark

MORE TONNAGE PER EDGE OF BLADE

AMERICAN SHEAR KNIFE CO.

HOMESTEAD, PENN.

University, who was employed by the State of California four years ago to develop models of the bridge to be used and tested for all load conditions, including temperature and wind, the results to be compared with the design calculations. Mr. Beggs described his studies in this connection and used lantern slides as a means of illustration.

Metal Window Manufacturers

(CONTINUED FROM PAGE 72)

located at strategic points throughout the United States, which bureau was designated by the trade association as the place to clear bids or prices for that particular area, for the purpose of securing identical gross or net price estimates which they used in bidding on the project in question.

The complaint charges that the trade association actively polices the industry, and by threats of penalties to those who sell below the prices fixed, induces many of the corporate respondents to adhere to those prices.

According to the complaint, the respondents, to prevent "non-cooperating" competitors from being successful bidders and to force them to become members of the association, declared the bidding on certain jobs "open," whereupon the corporate respondents allegedly underbid and undersold their "non-cooperating" competitors, and by such means and through threats, many of these competitors joined the association and became parties to the price-fixing agreement. It is further charged that the respondents effected the withdrawal and cancellation of bids submitted on projects where such bids offered the products of the industry at less than the prices fixed under the agreement.

The respondents' practices, the complaint alleges, had the effect of unduly restraining commerce, of substantially enhancing and maintaining prices at artificial levels, and of otherwise depriving the public of benefits that would result from normal competition.

The respondent corporations are:

William Bayley Co., Springfield, Ohio; Bliss Steel Products Corp., East Syracuse, N. Y.; Bougert & Carlough Co., Paterson, N. J.; Campbell Metal Window Corp., Baltimore; Concrete Engineering Co., Omaha; Crittall Mfg. Co., Inc., Washington; Detroit Steel Products Co., Detroit; Druwhit Metal Products Co., Los Angeles; Federal Steel Sash Co., Inc., Waukesha, Wis.; Michael Flynn Mfg. Co., Philadelphia; Hope's Windows, Inc., Jamestown, N. Y.; Kewanee Mfg. Co., Kewanee, Ill.; Mesker Brothers Iron Co., St. Louis; Michel & Pfeffer Iron Works, Inc., San Francisco; S. H. Pomeroy Co., Inc., New York; Soule Steel Co., San Francisco; J. S. Thorn Co., Philadelphia; Truscon Steel Co., Youngstown, and Vento Steel Sash Co., Inc., Muskegon Heights, Mich.

The commission fixed Dec. 18 as the date on which the respondents may show cause why they should not cease and desist from the practices alleged in the complaint.

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TOOL STEELS

in our large stock, to take care of almost every possible immediate need.

But our service to tool users goes beyond just selling "off the shelf." We also provide tailor made steels that are just right for the particular job you have to do.

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..PERSONALS..

LOUIS KUEHN and A. J. LUEDKE, of the Milcor Steel Co., have been elected members of the board of Inland Steel Co. Milcor Steel Co. became a wholly owned subsidiary

LOUIS KUEHN

A. J. LUEDKE

of Inland on July 1, 1936. Mr. Kuehn has been president of the Milcor Steel Co. since its establishment in 1902. He was connected with the Berger Mfg. Co., Canton, Ohio, for 7 years during which time he became thoroughly acquainted with the sheet metal business. In 1896 he formed the La Crosse Steel Roofing & Corrugating Co., and after six years went to Milwaukee to establish the Milwaukee Corrugating Co., since July 1, 1930, the Milcor Steel Co. Mr. Luedke took a position with the Milwaukee Corrugating Co. in 1906 after completing his education in the Milwaukee public schools and the University of Wisconsin. In 1906 he became secretary and assistant treasurer. On July 1, 1930, Mr. Luedke became secretary and treasurer. In addition to his work with Milcor, Mr. Luedke is a director of the Firemen's Insurance Co., Newark, N. J., a director of the Concordia Fire Insurance Co., Milwaukee.

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J. M. FERNALD, general manager of the Baker Ice Machine Co., Inc., Omaha, Neb., was elected president of the Refrigerating Machinery Association at its annual meeting in Washington, Nov. 13.

A. U. STEENROD, for the past seven years in charge of the Chicago plant of the Milcor Steel Co., Milwaukee, has been made manager of the Canton plant of the company.

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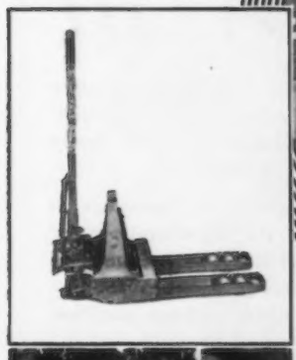
H. H. ERKELENZ, works manager of the Harnischfeger Corp., Milwaukee, has been advanced to the new position of manager of engineering and works. He joined the firm in 1911, was promoted to assistant works manager in 1924,

$72.00 SAVED!

ON EVERY CARLOAD OF TIN PLATE HANDLED

YALE



USERS of Yale Tin Plate Hand Lift Trucks report these savings—ten cents on every 100 lbs. of tin plate handled—$72.00 on every carload—economies worthy of consideration in ANY plant.

Yale Truck Users expect such savings because they know that Yale Tin Plate Hand Lift Trucks are BUILT for the job of economical lifting and hauling.

They save MONEY because—mill shipments can be made on pallets. The underslung construction enables the operator to easily roll the truck under the loaded pallet, pick it up and haul it from the freight car to its destination . . . no lost time or lost motion.

Let our representative tell you WHAT and HOW Yale Hand Lift Trucks and Skid Platforms can save on YOUR materials handling jobs.

THE YALE & TOWNE MFG. CO.

PHILADELPHIA DIVISION • Philadelphia, Pa., U. S. A.

and made works manager in 1933. He is succeeded by HERMAN MENCK, who became assistant works manager in 1934, prior to which year he held a similar post with the Waukesha Motor Co., Waukesha, Wis.

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GEORGE B. CUSHING, who has been identified since 1928 with the A. M. Beyers Co., Pittsburgh, has been appointed manager of sales promotion. In 1931 he organized the engineering service department for the company. B. D. LANDES, who has been in the technical group since its inception, has been made manager of the engineering service department. T. C. WINANS, identified with the advertising department since 1930, has been appointed advertising manager. Both the manager of the engineering service department and the advertising manager become a part of the newly formed sales promotion group headed by Mr. Cushing. R. H. GARDNER, formerly of the Washington office, has been appointed manager of pipe sales.

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WAYLAND S. BOWSER has been made manager of the newly-consolidated bureau of sales statistics of the Carnegie-Illinois Steel Corp., with office in Pittsburgh. He was formerly supervisor of office methods of the industrial engineering department. ELMER E. ERICKSON is assistant manager of the consolidated bureau, having been formerly manager of the bureau of sales statistics in the Chicago district. Other members of the staff are L. E. GRUBBS, chief clerk and R. L. TWITCHELL, sales statistician.

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JULIAN M. AVERY, electrochemical and metallurgical engineer, has joined the staff of Arthur D. Little, Inc., Cambridge, Mass. He is a graduate of Massachusetts Institute of Technology and obtained his first practical plant experience as a lieutenant in the chemical warfare section of the Army. He has been serving various subsidiaries of the Union Carbide & Carbon Corp. both in the United States and in Europe.

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ARTHUR M. PRICE, of Price-Watson Co., was elected president of the Chicago chapter of the Institute of Scrap Iron and Steel at the annual meeting Nov. 12. Other officers elected are: First vice-president, John T. McEnroe, John T. McEnroe Co.; second vice-president, Max Patinken, Peoples Iron & Metal Co.; third vice-president, Walter Newman, Hyman-Michaels Co.; secretary, Harvey Kaplan, M. S. Kaplan Co.; treasurer, Arthur L. Jeffery.

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JACK R. FORCHEIMER, St. Louis, was elected president of the St. Louis chapter of the Institute of Scrap Iron and Steel, at the annual meeting Nov. 10. Other officers elected were: first vice-president, Harry Kiener, of Hickman, Williams & Co., St. Louis; second vice-president, Jack Forster, of Standard Steel & Rail Co., St. Louis; third vice-president, C. C. Cohen, of I. J. Cohen & Co., Kansas City, Kan.; secretary-treasurer, Fred S. Fuld, of Harry Benjamin Equipment Co., St. Louis; chairman of executive committee, David H. Cohen, of D. H. Cohen, Inc., St. Louis, the retiring president.

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MAURICE D. FRIEDMAN, of the company of the same name, Ashland, Ky., has been elected president of the Cincinnati chapter of the Institute of Scrap Iron and Steel. Other officers elected

Just as the speed boat is designed to offer least resistance to the water—ULTRA-CUT Screw Stock is developed to work easily and smoothly under the tool.

This high sulphur grade of Bessemer is an achievement in the development of specialized steels. It is nicely balanced in physical and chemical properties to give maximum machinability without sacrifice of quality in the finished product.

Ultra-Cut gives an average increased production of 30% to 40% over the usual grades of free-machining steels—and even doubles output under favorable conditions. It assures finely finished parts with chip-free operation. Fewer tool grinds and less "down time"—when you run Ultra-Cut Steel on your automatics.

Try Ultra-Cut on your next order for screw stock—and watch your production point upward—and your machining costs downward.

- **Cold Drawn Bars**
- **Ground Shafting**
- **Screw Stock**
- **Special Sections**
- **Alloy Steels**

BETTER MADE STEELS LABORATORY TESTED

Performance records are shown in the B & L Ultra-Cut Folder. Copy sent on request.

BLISS & LAUGHLIN, INC.

HARVEY, ILL. *Sales Offices in all Principal Cities* **BUFFALO, N.Y.**

include: H. MOSKOWITZ, of Moskowitz Brothers, Cincinnati, vice-president, and EDWARD SCHLEZINGER, of I. H. Schlezinger & Son, Columbus, Ohio, secretary-treasurer.

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D. M. PATTISON, sales engineer for the Warner & Swasey Co. in Chicago for the past six years, has been appointed manager of the company's Cleveland sales territory. A native of Chicago, Mr. Pattison was graduated from the University of Illinois in 1922 and spent three years in time study work, product and methods engineering under the Bedaux system for the Ruud Mfg. Co., the Hydraulic Pressed Steel Co. and the Industrial Brownhoist Corp. Following several years of sales and engineering work for the Federal Electric Co., Chicago, and the Wardwell Mfg. Co., Cleveland, during which time he also designed and marketed equipment for filing and setting of wood-cutting saws, he joined the Warner & Swasey Co. as special apprentice in 1928. Mr. Pattison had several years of experience in the company's tool design department before joining its sales organization.

Brass Forgers Form Association

AT a meeting of the members of the brass forging industry of the country, held in New York, delegates representing practically the entire industry formed a national organization, the Brass Forging Association. A complete constitution and by-laws were adopted, and the following directors were elected:

H. B. Harvey, president, Harvey Metal Corp., Chicago, Ill.

F. L. Riggin, president, Mueller Brass Co., Port Huron, Mich.

G. F. R. Wheat, assistant sales manager, Revere Copper & Brass, Inc., Rome, N. Y.

Otto Von Au, Accurate Brass Co., Brooklyn, N. Y.

E. S. Wayland, vice-president, American Brass Co., Waterbury, Conn.

T. W. Kuhn, assistant to president, Bohn Aluminum & Brass Corp., Detroit.

F. S. Hyde, Scovill Mfg. Co., Waterbury, Conn.

E. R. Chase, assistant sales manager, Chase Brass & Copper Co., Waterbury, Conn.

The officers elected are as follows: H. B. Harvey, president; T. W. Kuhn, vice-president; G. F. R. Wheat, secretary; F. L. Riggin, treasurer.

...OBITUARY...

BUCKNER A. WALLINGFORD, owner of Walter-Wallingford Co., pig iron broker, Cincinnati, died at his home in that city on Nov. 12, aged 67 years. He became associated early in his career with late Thomas A. Mack in the pig iron brokerage business in Cincinnati. Soon afterward he formed a partnership in this business with the late Lewis Walter under the name Walter-Wallingford & Co., of which he became sole proprietor upon Mr. Walter's death.

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RICHARD M. DORSEY, formerly president of the M. H. Treadwell Co., New York, died on Nov. 3. He joined the Treadwell organization in 1901 and 20 years later was

STOP RUST!

SAVE MONEY WITH THIS NEW "MARKS BOND" A Bonding Process

Holds paint or enamel to steel or iron. Prevents rust. ★ Saves time on processing (either tank or spray system). ★ Saves on equipment space. ★ Saves on fuel and heating of tanks. ★ No sludge. ★ Has passed salt spray and humidity tests. ★ Gives controlled etching—light or heavy. ★ Has been commercially tested. ★ Has been officially approved by several of Detroit's largest industrial plants.

WRITE FOR FREE DATA OR FOR DETAILS FOR MAKING FREE TEST

MARKS BOND

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The NEW WELDIT MODEL A Automatic
WELDING TORCH
with GASAVER in Handle

SAVES FUEL...
...CUTS COST

Thumb controlled Gasaver in handle cuts welding flame to pilot light size instantly when torch is not in actual use. Savings not affected by hose length. No re-lighting, no re-adjusting. Safe and simple to operate.

Send for literature.

WELDIT ACETYLENE CO. 641 BAGLEY AVE. DETROIT, MICH.

TEST THIS WELDING TORCH FREE FOR TWO WEEKS IN YOUR PLANT

made president. He retired in January, 1935, because of increasing years and declining health.

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C. H. STRONG, formerly president of the old Mount Hickory Iron Works, died at his home in Erie, Pa., aged 83 years. He was graduated from Yale University in 1877 and joined the company as a shipping clerk.

MARTIN E. MCKEE, pioneer railroad man and retired district manager of the Republic Iron & Steel Co., died recently at his home in Cincinnati, after a six weeks' illness. He was 72 years old. Inventor of the McKee slack adjuster, now standard air brake equipment on modern trains, Mr. McKee became interested in railroads as a youth, becoming one of the pioneers in railroading in the Northwest. He was a master mechanic with the Great Northern Railroad for 11 years. Leaving that company, he entered the railroad supply business and later became associated with the steel company.

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LOUIS C. NICHOLS, chief engineer in charge of the transformer section of the electrical division of the Allis-Chalmers Mfg. Co., Milwaukee, died on Nov. 3, aged 58 years. He was born in Westminster, Mass., and received his engineering training at Worcester Polytechnic Institute and the General Electric Co. graduate test course. After a number of years with the Converse Electric Co. at Pittsburgh, Mr. Nichols in 1903 joined the Bullock Electric & Mfg. Co., Norwood, Cincinnati, which was merged with the Allis-Chalmers Mfg. Co. in 1904. He was made chief engineer of the entire Bullock division in 1911, and when its transformer business was transferred to the main works in Milwaukee in 1915 he followed as chief engineer, a position he held until his death.

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CONRAD TRIMBORN, founder of the Milwaukee Bridge Co., Milwaukee, and president and treasurer since its establishment in 1902, died on Oct. 30, aged 70 years. He was born in Milwaukee, and before founding the structural steel works he was for 10 years secretary of the C. H. Starke Dredge & Dock Co., Milwaukee. A son, Conrad L., is secretary of the bridge company, and another son, Henry A. Trimborn, is a director of the corporation.

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CHARLES A. MAYDWELL, formerly president of Maydwell & Hartzell, Inc., San Francisco, manufacturers' representative, died at the Providence Hospital in Oakland, Cal., on Nov. 10, aged 83 years. He retired about a year ago.

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CHARLES A. DIETZ, a founder of the Admak Mfg. Corp., Irvington, N. J., died at a Newark N. J., hospital on Nov. 9, aged 58 years.

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W. L. PERKINS, until his retirement in 1926 manager of the Cincinnati plant of the United States Pipe & Foundry Co., died at his home in that city on Nov. 9, aged 76 years. Until a few years ago, he was active in the Cincinnati branch of the National Metal Trades Association.

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JAMES W. RICE, vice-president and general manager of the W. C. Stebbins Co., Inc., Watertown, N. Y., mill supply and machinery dealer, died at his home in that city of a heart attack on Nov. 10, aged 64 years.

★
Specialists in
Alloy and Tool Steel
TUBING

Our concentration on tubing enables us to give customers the benefit of our special skill and experience. Large stocks available for immediate shipment—Tool Steel Tubing, Ball Bearing Tubing, Stainless Tubing, Aircraft Tubing, Hypodermic Tubing, Cold Drawn Mechanical Tubing, A.S.M.E. Boiler Tubing.

May We Serve You?

THE BISSETT STEEL COMPANY, Cleveland, O.
The Tubing Specialists

Cement-Bonded Sand Used by Mold Maker

(CONTINUED FROM PAGE 51)

sands are reduced to a minimum. This factor results in a quieter casting of the metal due to the absence of formation of gases from the sand mold itself. A small amount of steam is formed after the casting is set and is dissipated readily, owing to the high porosity of the cement-sand mold. Also its excellent insulating property provides an annealing effect which reduces casting stresses in the finished ingot molds.

The company has already obtained successful results from the introduction of this new method of manufacturing ingot molds. They have experienced more freedom from casting imperfections which formerly required chipping and grinding to produce a smooth ingot surface. Variables causing surface defects have been practically eliminated. Without the necessary chipping and grinding required under their previous method, the greater part of the original "skin" on the ingot surface of the mold is retained, which makes the finished mold more resistant to fire cracking.

The excellent insulating properties of the silica sand is said to produce an annealing effect on the casting which reduces casting stresses to a minimum. This is very beneficial to the life of the ingot mold since casting stresses tend to produce cracks in the mold which materially reduce its life and cause surface defects on the ingot. Vulcan has also found the new process to result in a trueness to size and contour not obtained to the same extent in the practice which they used formerly.

According to Vulcan, they installed the Randupson process for the purpose of producing a better ingot mold for the same or lower cost. Their experience to date apparently leaves no question as to the improvement in quality over molds made by the process which they previously used in their plant and which has been the customary process for the manufacture of ingot molds for many years.

Summing up the outstanding advantages which this company claims for the new method of manufacture, they feel that there has resulted an exact control of variable factors to an extent not previously possible by the old process. Drastic reduction in chipping and grinding of the finished ingot mold surfaces has resulted in a retention of the "skin". It is known that the removal of this "skin" opens the pores of the metal, thus promoting oxidation and accelerated "fire cracking" with a resultant shorter mold life. They feel also that the elimination of casting stresses in the molds due to the annealing effect of the highly insulating sand mixture, reduces the tendency for molds to crack from thermal stress. It was their contention and it is now their experience that the installation of the proper machinery to give the best possible results from the use of the Randupson process has been such as to make the manufacture of ingot molds as free from variables as possible.

BECAUSE IT HAS STEARNS FORCED VENTILATION AND RADIATION

More pull—50% greater magnetic pulling power—is inherent in Stearns' Magnetic Pulleys because of the Stearns' principle of forced ventilation and magnetic radiation. This principle includes the famous Stearns one-piece, horse-shoe magnet body member and the high cooling efficiency of forced ventilation through air ducts.

The greater magnetic strength of Stearns' magnetic pulleys has been known and utilized by users for more than twenty years . . . Stearns' pulleys are preferred as the outstanding value in their field. Write for full information.

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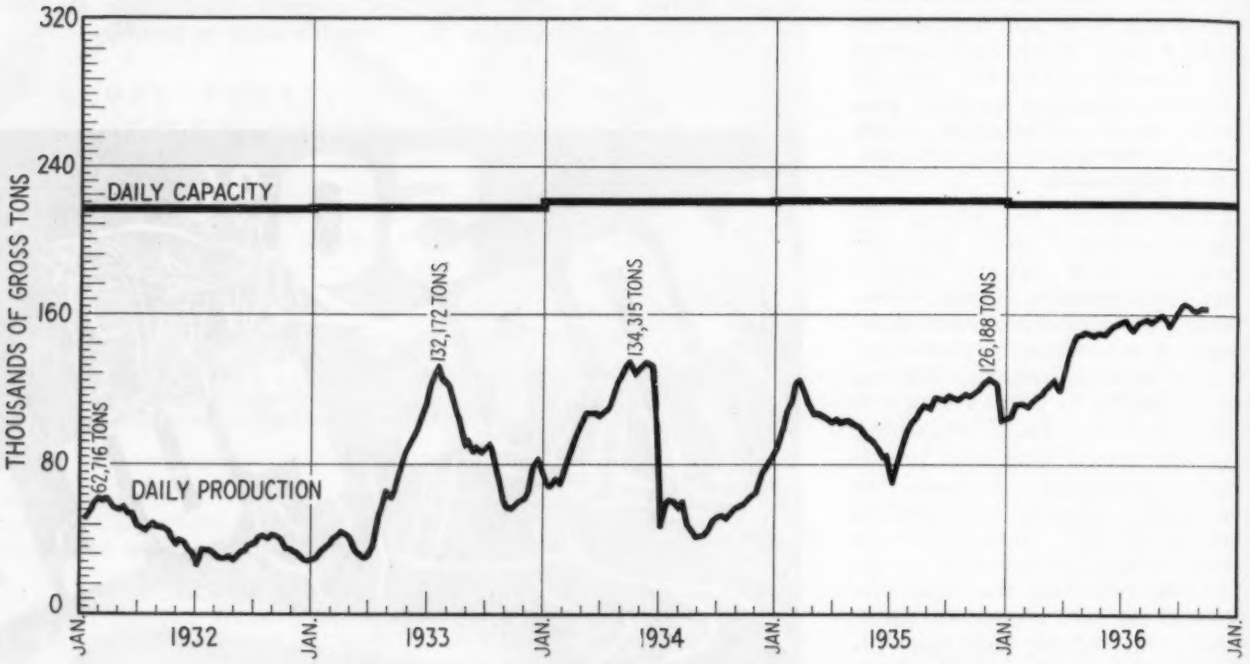
MAGNETIC EQUIPMENT

STEARNS MAGNETIC MFG. CO.
626 S. 28 St., Milwaukee, Wis.

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936

Current Week	Last Week	Weeks Ended Nov. 23, 1935	Nov. 24, 1934	Nov. 25, 1933	Nov. 26, 1932
162,410	163,507	120,653	62,754	59,586	35,683



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended Oct. 24, 1936	Nov. 23, 1935	Nov. 24, 1934
Pittsburgh	69.0	70.0	72.0	45.0	18.0
Chicago	76.0	76.0	74.5	61.5	33.0
Valleys	74.0	75.0	76.0	56.0	32.0
Philadelphia	55.0	55.0	55.5	40.0	24.0
Cleveland	78.0	84.0	82.0	77.0	37.0
Buffalo	84.0	84.0	78.0	33.0	24.0
Wheeling	93.0	93.0	93.0	83.0	55.0
Southern	69.5	69.5	58.0	46.0	17.0
Ohio River	95.0	95.0	88.0	88.0	35.0
Western	59.0	59.0	59.0	35.0	15.0
St. Louis	70.0	69.0	72.0	54.5	25.0
Detroit	100.0	100.0	95.0	95.0	47.0
Eastern	85.0	85.0	90.0	35.0	25.0
Aggregate	74.0	74.5	74.0	54.5	28.5
Average Year to Date	66.1	65.9	65.3	47.5	37.6

Weekly Booking of Construction Steel

From THE IRON AGE

	Week Ended Nov. 17, 1936	Nov. 10, 1936	Oct. 20, 1936	Nov. 19, 1935	Year to Date 1936	1935
Fabricated structural steel awards	9,200	26,000	9,850	11,250	929,430	688,990
Fabricated plate awards	1,065	230	1,480	4,665	192,860	131,620
Steel sheet piling awards	400	1,825	1,970	300	52,365	57,705
Reinforcing bar awards	3,525	4,450	1,525	1,315	302,500	280,465
Total Lettings of Construction Steel	14,190	32,505	14,825	17,530	1,477,155	1,158,780

. . . .SUMMARY OF THE WEEK. . . .

. . . Price advances for first quarter may go as high as $4 a ton on sheets.

o o o

. . . Mills may decline business that cannot be rolled and shipped by Jan. 1.

o o o

. . . Though some backlogs are lower, production holds at 74 per cent.

BUYERS and sellers of steel are awaiting an announcement by one of the steel producers that will indicate the amount of the price advances expected for the first quarter. Latest indications are that the new prices will be $2 higher on semi-finished, $3 on bars, shapes and plates and either $3 or $4 on sheets and strip.

Carnegie-Illinois Steel Corp. on Tuesday announced a change in tin plate prices, effective Jan. 1, to $4.85 per base box, Pittsburgh, and $4.95, Gary, and the discontinuance of the 7½ per cent discount which became general under the NRA steel code. While the official prices of tin plate now in effect are $5.25, Pittsburgh, and $5.35, Gary, the discount resulted in a net price of $4.86, Pittsburgh, which all users have been charged for some time. Prices on light coated manufacturing terne plate, also effective Jan. 1, have been announced as $4.15 per base box, Pittsburgh, and $4.25, Gary. The Pittsburgh price was $4.30, subject to the 7½ per cent discount, which is also discontinued on this product.

Meanwhile, mills are not encouraging speculative buying, and, as a matter of fact, there has been comparatively little effort in that direction among buyers except in sheets, in which most of the mills have little or no tonnage available for shipment during the remainder of the quarter. It is intimated that mills may decline to take orders at present prices that cannot be rolled and shipped by Dec. 31.

MORE speculative buying has occurred in pig iron than in steel. At Chicago new business and shipments are near the peak for the year. Some furnace interests are expected to insist that all current bookings be shipped or cancelled as of Dec. 31. Stocks of pig iron in the hands of producers have recently been reduced and output may not be increased greatly during the next few months because of coke shortage. A steel company furnace at Cleveland has been forced to go out of blast for necessary repairs, which will include an enlargement of its capacity. It is predicted that an 80 per cent operation of steelmaking capacity would bring about a shortage of pig iron.

Steel ingot output is subject to fluctuations, being slightly higher at Chicago and lower at Pittsburgh, Youngstown and Lorain. For the country as a whole it is estimated at 74 per cent for this week.

November steel bookings have been considerably below those of the very active period from mid-September to mid-October, but will undoubtedly increase when new prices are announced. An upturn has already occurred at Chicago, but is not apparent in other districts to any marked degree, except that orders from the automobile industry have gained as production climbs above 100,000 cars a week.

RAIL orders will add a substantial tonnage to mill books during the remainder of this month. At Chicago fully 275,000 tons is pending, in addition to 20,000 tons bought by the Union Pacific. The Pennsylvania has ordered 100,000 tons, the New York Central will buy upward of 50,000 tons and other Eastern roads are expected to swell the total for the whole country to 500,000 tons or more for this month. Some roads are delaying formal orders until announcement is made of the new rail price, which, it is believed, will be $40.

The Chesapeake & Ohio Railroad has inquired for 2000 freight cars and the Western Pacific is in the market for 11 locomotives. A good deal of prospective railroad equipment buying, it is believed, may be postponed until after Jan. 1.

While the heavy steels have been in somewhat of a slump, the outlook is improving as more large projects come into the market. Bids will be taken Nov. 25 on the Navy Department's floating dry dock for Pearl Harbor, T. H., which will take nearly 30,000 tons of plates and shapes; a pipe line in California will require 20,000 tons of plates, and an Eastern pipe line project calls for upward of 25,000 tons of plates.

WITH heavy melting steel scrap down 50c. a ton at Philadelphia, THE IRON AGE steel scrap composite has declined to $16.17, which is 58c. a ton below the year's peak.

. . . PITTSBURGH . . .

. . . Price announcements for first quarter expected this week.

o o o

. . . Advances may range from $2 to $3, with possibility of $4 on sheets.

o o o

. . . Ingot production eases slightly in Pittsburgh, unchanged at Wheeling.

PITTSBURGH, Nov. 17.—Steel prices for first quarter delivery probably will be announced by some producers this week. No formal intimation as to the price advances have been given, although there is a good possibility that semi-finished steel will be up $2 a ton, bars, shapes and plates up $3, and the lighter products up $3 or $4. It is also possible that prices may become effective immediately upon announcement, if not on all products at least on some, such as sheets.

A substantial number of sheet producers are already booked up to the end of the year and, even though prices might not become effective immediately, many mills would be out of the market long before the early part of December, since enough new business will be placed to fill up any possible openings in production schedules.

Increased cost of making steel and the necessity for price adjustments to bring some products into a more economic alinement with others have made price advances a foregone conclusion.

Steel ingot production in the Pittsburgh district has eased off one point to 69 per cent of capacity, while the Wheeling district remains unchanged at 93 per cent.

New orders in the past week continued below the volume shipped. Consequently, backlogs have been further reduced, excepting sheets. Hot-rolled bar specifications are as good as a week ago and some anticipatory buying has taken place in the sheet market. Following price announcements, a heavier flow of incoming orders will materialize. No let-down in the amount of pressure for deliveries exerted by some consumers has occurred.

It is expected that a large share of the 100,000-ton rail order of the Pennsylvania Railroad will be made in this district. There is a good possibility that other eastern railroads will place substantial rail orders before Dec. 1. Since any rail tonnage at present quotations must be shipped by the end of the first quarter, brisk production of rails and accessories is expected after the first of the year. Rail prices will probably be advanced to $40 a ton.

Lighter orders and the working off of some backlogs have brought tin plate operations down to 89 per cent.

Raw material markets continue firm and quiet.

Pig Iron

There is a distinct possibility that the long-expected advance in prices will be announced soon. However, neither producers nor consumers are worrying much about this factor as most producers in this district are out of the market and practically all consumers have long since placed contracts covering their requirements to the end of the year. Meanwhile, production is being maintained at a high rate and shipments are extremely heavy. Owing to heavy consumption of iron, no large stocks have been built up.

Semi-Finished Steel

Demand has been improving over the past few weeks, and it is certain that bookings, will be extremely heavy during the remainder of this year, in view of the higher prices to be announced for first quarter delivery. A particularly heavy movement of sheet bars has taken place over the past week, reflecting large production of sheets at non-integrated plants. Quotations on semi-finished material for first quarter will probably be $2 a ton above present prices.

Bolts, Nuts and Rivets

New business is holding up well and shows little change from a week ago. Additional orders from railroads for car repair programs, involving satisfactory tonnages, have been received. Takings by automobile manufacturers are quite substantial and there is reason to believe that this source will be specifying freely over the remainder of the year. It is a foregone conclusion that bolt and nut fabricators will pay more for their raw material during the first quarter of 1937 and it naturally follows that they may mark up their prices accordingly.

Bars

Price announcements are expected some time this week and there is a good chance that first quarter quotations will be up $3. When price increases are formally announced, there will be a spurt in bookings, since the majority of customers have about used up any anticipatory material booked during the latter part of September. While orders over the past few weeks have not been at a high rate, they have been much better than those placed during the first three weeks of October. Releases from automotive interests have been increasing and fresh orders from miscellaneous sources have shown a slight improvement. These factors, combined with requests for better shipments, indicate clearly that no large stocks are held by consumers. There is a better tendency to anticipate requirements further ahead, and buying practices today are more nearly approaching those existing before the depression, when delivery was of paramount importance.

Cold-Finished Bars

First quarter quotations will probably be announced some time this week and will show an increase over present prices. Meanwhile, mill backlogs have been further reduced and average around four to six weeks, depending on size and grade. Practically all producers are being pushed for shipments. New orders, while not assuming large proportions at this time, are satisfactory in view of the heavy commitments placed some time ago.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 17, 1936	Nov. 10, 1936	Oct. 20, 1936	Nov. 19, 1935
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	32.00	32.00	32.00	29.00
Sheet bars, Pittsburgh	32.00	32.00	32.00	30.00
Slabs, Pittsburgh	32.00	32.00	32.00	29.00
Forging billets, Pittsburgh	39.00	39.00	39.00	35.00
Wire rods, Nos. 4 and 5, P'gh	40.00	40.00	40.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.05	2.05	2.05	1.85
Bars, Chicago	2.10	2.10	2.10	1.90
Bars, Cleveland	2.10	2.10	2.10	1.90
Bars, New York	2.40	2.40	2.40	2.20
Plates, Pittsburgh	1.90	1.90	1.90	1.80
Plates, Chicago	1.95	1.95	1.95	1.85
Plates, New York	2.19	2.19	2.19	2.09
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.90
Structural shapes, Chicago	1.95	1.95	1.95	1.85
Structural shapes, New York	2.16¼	2.16¼	2.16¼	2.06¼
Cold-finished bars, Pittsburgh	2.35	2.35	2.35	1.95
Hot-rolled strips, Pittsburgh	1.95	1.95	1.95	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.60	2.60	2.60	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.70	2.70	2.70	2.50
Sheets, galv., No. 24, P'gh	3.20	3.20	3.20	3.10
Sheets, galv., No. 24, Gary	3.30	3.30	3.30	3.20
Hot-rolled sheets, No. 10, Pittsburgh	1.95	1.95	1.95	1.85
Hot-rolled sheets, No. 10, Gary	2.05	2.05	2.05	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.05	3.05	3.05	2.95
Cold-rolled sheets, No. 20, Gary	3.15	3.15	3.15	3.05
Wire nails, Pittsburgh	2.05	2.05	2.05	2.40
Wire nails, Chicago dist. mill	2.10	2.10	2.10	2.45
Plain wire, Pittsburgh	2.50	2.50	2.50	2.30
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.35
Barbed wire, galv., P'gh	2.55	2.55	2.55	2.80
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	2.85
Tin plate, 100-lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

Pig Iron

Per Gross Ton:	Nov. 17, 1936	Nov. 10, 1936	Oct. 20, 1936	Nov. 19, 1935
No. 2, fdy., Philadelphia	$21.3132	$21.3132	$21.3132	$21.3132
No. 2, Valley furnace	19.50	19.50	19.50	19.50
No. 2, Southern Cin'ti	19.44	19.44	19.44	20.2007
No. 2, Birmingham†	15.88	15.88	15.88	14.50
No. 2, foundry, Chicago*	19.50	19.50	19.50	19.50
Basic, del'd eastern Pa.	20.8132	20.8132	20.8132	20.8132
Basic, Valley furnace	19.00	19.00	19.00	19.00
Malleable, Chicago*	19.50	19.50	19.50	19.50
Malleable, Valley	19.50	19.50	19.50	19.50
L. S. charcoal, Chicago	25.7518	25.7518	25.7528	25.2528
Ferromanganese, seab'd carlots	75.00	75.00	75.00	85.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.

*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	$17.25	$17.25	$17.75	$13.75
Heavy melting steel, Phila.	14.75	15.25	15.75	12.00
Heavy melting steel, Ch'go	16.50	16.50	16.25	13.25
Carwheels, Chicago	16.50	16.50	16.50	13.25
Carwheels, Philadelphia	16.75	16.75	16.75	12.75
No. 1 cast, Pittsburgh	16.25	16.25	16.25	14.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	12.75
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	11.75
No. 1 RR. wrot., Phila.	15.75	15.75	15.75	12.25
No. 1 RR. wrot., Ch'go (net)	14.25	14.25	14.25	11.00

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$3.75	$3.75	$3.75	$3.60
Foundry coke, prompt	4.25	4.25	4.25	4.25

Metals

Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, Conn.	10.50	10.50	9.75	9.00
Lake copper, New York	10.62½	10.62½	9.87½	9.37½
Tin (Straits), New York	51.87½	54.00	44.60	51.50
Zinc, East St. Louis	5.05	4.95	4.85	4.85
Zinc, New York	5.42½	5.32½	5.22½	5.22½
Lead, St. Louis	5.05	4.95	4.45	4.35
Lead, New York	5.20	5.10	4.60	4.50
Antimony (Asiatic), N. Y.	12.50	12.50	12.50	15.50

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Nov. 17, 1936	2.197c. a Lb.	$18.73 a Gross Ton	$16.17 a Gross Ton
One week ago	2.197c.	18.73	16.33
One month ago	2.197c.	18.73	16.58
One year ago	2.130c.	18.84	13.00

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1936	2.197c., Sept. 29	2.084c., Mar 10	$18.84, Jan. 7	$18.73, Aug. 11	$16.75, Sept. 22	$12.67, June 9
1935	2.130c., Oct. 1	2.124c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, April 23
1934	2.199c., April 24	2.008c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	2.015c., Oct. 3	1.867c., April 18	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
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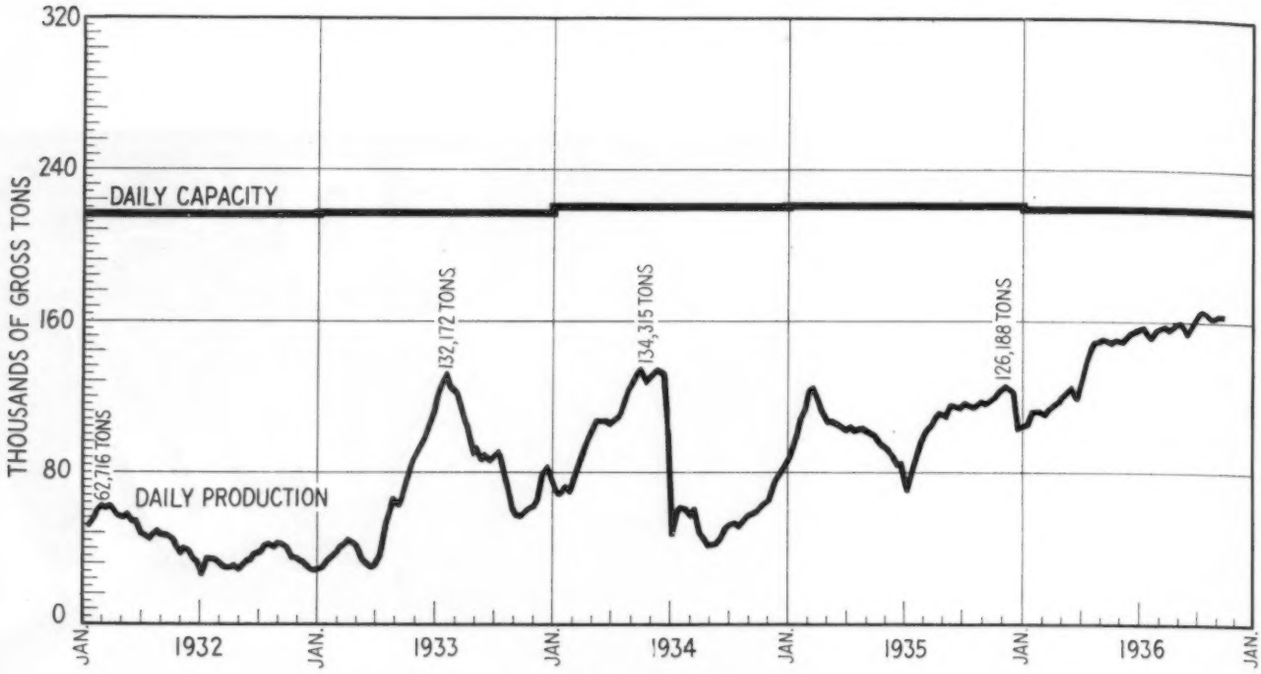
STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1932-1936

Current Week	Last Week	Weeks Ended Nov. 23, 1935	Nov. 24, 1934	Nov. 25, 1933	Nov. 26, 1932
162,410	163,507	120,653	62,754	59,586	35,683



Figures for the current week are not indicated on the chart until the following week.

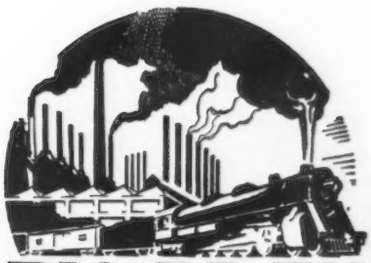
STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended Oct. 24, 1936	Nov. 23, 1935	Nov. 24, 1934
Pittsburgh	69.0	70.0	72.0	45.0	18.0
Chicago	76.0	76.0	74.5	61.5	33.0
Valleys	74.0	75.0	76.0	56.0	32.0
Philadelphia	55.0	55.0	55.5	40.0	24.0
Cleveland	78.0	84.0	82.0	77.0	37.0
Buffalo	84.0	84.0	78.0	33.0	24.0
Wheeling	93.0	93.0	93.0	83.0	55.0
Southern	69.5	69.5	58.0	46.0	17.0
Ohio River	95.0	95.0	88.0	88.0	35.0
Western	59.0	59.0	59.0	35.0	15.0
St. Louis	70.0	69.0	72.0	54.5	25.0
Detroit	100.0	100.0	95.0	95.0	47.0
Eastern	85.0	85.0	90.0	35.0	25.0
Aggregate	74.0	74.5	74.0	54.5	28.5
Average Year to Date	66.1	65.9	65.3	47.5	37.6

Weekly Booking of Construction Steel

From THE IRON AGE

	Week Ended Nov. 17, 1936	Nov. 10, 1936	Oct. 20, 1936	Nov. 19, 1935	Year to Date 1936	1935
Fabricated structural steel awards	9,200	26,000	9,850	11,250	929,430	688,990
Fabricated plate awards	1,065	230	1,480	4,665	192,860	131,620
Steel sheet piling awards	400	1,825	1,970	300	52,365	57,705
Reinforcing bar awards	3,525	4,450	1,525	1,315	302,500	280,465
Total Lettings of Construction Steel	14,190	32,505	14,825	17,530	1,477,155	1,158,780



. . . . SUMMARY OF THE WEEK. . . .

. . . Price advances for first quarter may go as high as $4 a ton on sheets.

o o o

. . . Mills may decline business that cannot be rolled and shipped by Jan. 1.

o o o

. . . Though some backlogs are lower, production holds at 74 per cent.

BUYERS and sellers of steel are awaiting an announcement by one of the steel producers that will indicate the amount of the price advances expected for the first quarter. Latest indications are that the new prices will be $2 higher on semi-finished, $3 on bars, shapes and plates and either $3 or $4 on sheets and strip.

Carnegie-Illinois Steel Corp. on Tuesday announced a change in tin plate prices, effective Jan. 1, to $4.85 per base box, Pittsburgh, and $4.95, Gary, and the discontinuance of the 7½ per cent discount which became general under the NRA steel code. While the official prices of tin plate now in effect are $5.25, Pittsburgh, and $5.35, Gary, the discount resulted in a net price of $4.86, Pittsburgh, which all users have been charged for some time. Prices on light coated manufacturing terne plate, also effective Jan. 1, have been announced as $4.15 per base box, Pittsburgh, and $4.25, Gary. The Pittsburgh price was $4.30, subject to the 7½ per cent discount, which is also discontinued on this product.

Meanwhile, mills are not encouraging speculative buying, and, as a matter of fact, there has been comparatively little effort in that direction among buyers except in sheets, in which most of the mills have little or no tonnage available for shipment during the remainder of the quarter. It is intimated that mills may decline to take orders at present prices that cannot be rolled and shipped by Dec. 31.

MORE speculative buying has occurred in pig iron than in steel. At Chicago new business and shipments are near the peak for the year. Some furnace interests are expected to insist that all current bookings be shipped or cancelled as of Dec. 31. Stocks of pig iron in the hands of producers have recently been reduced and output may not be increased greatly during the next few months because of coke shortage. A steel company furnace at Cleveland has been forced to go out of blast for necessary repairs, which will include an enlargement of its capacity. It is predicted that an 80 per cent operation of steelmaking capacity would bring about a shortage of pig iron.

Steel ingot output is subject to fluctuations, being slightly higher at Chicago and lower at Pittsburgh, Youngstown and Lorain. For the country as a whole it is estimated at 74 per cent for this week.

November steel bookings have been considerably below those of the very active period from mid-September to mid-October, but will undoubtedly increase when new prices are announced. An upturn has already occurred at Chicago, but is not apparent in other districts to any marked degree, except that orders from the automobile industry have gained as production climbs above 100,000 cars a week.

RAIL orders will add a substantial tonnage to mill books during the remainder of this month. At Chicago fully 275,000 tons is pending, in addition to 20,000 tons bought by the Union Pacific. The Pennsylvania has ordered 100,000 tons, the New York Central will buy upward of 50,000 tons and other Eastern roads are expected to swell the total for the whole country to 500,000 tons or more for this month. Some roads are delaying formal orders until announcement is made of the new rail price, which, it is believed, will be $40.

The Chesapeake & Ohio Railroad has inquired for 2000 freight cars and the Western Pacific is in the market for 11 locomotives. A good deal of prospective railroad equipment buying, it is believed, may be postponed until after Jan. 1.

While the heavy steels have been in somewhat of a slump, the outlook is improving as more large projects come into the market. Bids will be taken Nov. 25 on the Navy Department's floating dry dock for Pearl Harbor, T. H., which will take nearly 30,000 tons of plates and shapes; a pipe line in California will require 20,000 tons of plates, and an Eastern pipe line project calls for upward of 25,000 tons of plates.

WITH heavy melting steel scrap down 50c. a ton at Philadelphia, THE IRON AGE steel scrap composite has declined to $16.17, which is 58c. a ton below the year's peak.

. . . PITTSBURGH . . .

. . . Price announcements for first quarter expected this week.

o o o

. . . Advances may range from $2 to $3, with possibility of $4 on sheets.

o o o

. . . Ingot production eases slightly in Pittsburgh, unchanged at Wheeling.

PITTSBURGH, Nov. 17.—Steel prices for first quarter delivery probably will be announced by some producers this week. No formal intimation as to the price advances have been given, although there is a good possibility that semi-finished steel will be up $2 a ton, bars, shapes and plates up $3, and the lighter products up $3 or $4. It is also possible that prices may become effective immediately upon announcement, if not on all products at least on some, such as sheets.

A substantial number of sheet producers are already booked up to the end of the year and, even though prices might not become effective immediately, many mills would be out of the market long before the early part of December, since enough new business will be placed to fill up any possible openings in production schedules.

Increased cost of making steel and the necessity for price adjustments to bring some products into a more economic alinement with others have made price advances a foregone conclusion.

Steel ingot production in the Pittsburgh district has eased off one point to 69 per cent of capacity, while the Wheeling district remains unchanged at 93 per cent.

New orders in the past week continued below the volume shipped. Consequently, backlogs have been further reduced, excepting sheets. Hot-rolled bar specifications are as good as a week ago and some anticipatory buying has taken place in the sheet market. Following price announcements, a heavier flow of incoming orders will materialize. No let-down in the amount of pressure for deliveries exerted by some consumers has occurred.

It is expected that a large share of the 100,000-ton rail order of the Pennsylvania Railroad will be made in this district. There is a good possibility that other eastern railroads will place substantial rail orders before Dec. 1. Since any rail tonnage at present quotations must be shipped by the end of the first quarter, brisk production of rails and accessories is expected after the first of the year. Rail prices will probably be advanced to $40 a ton.

Lighter orders and the working off of some backlogs have brought tin plate operations down to 89 per cent.

Raw material markets continue firm and quiet.

Pig Iron

There is a distinct possibility that the long-expected advance in prices will be announced soon. However, neither producers nor consumers are worrying much about this factor as most producers in this district are out of the market and practically all consumers have long since placed contracts covering their requirements to the end of the year. Meanwhile, production is being maintained at a high rate and shipments are extremely heavy. Owing to heavy consumption of iron, no large stocks have been built up.

Semi-Finished Steel

Demand has been improving over the past few weeks, and it is certain that bookings, will be extremely heavy during the remainder of this year, in view of the higher prices to be announced for first quarter delivery. A particularly heavy movement of sheet bars has taken place over the past week, reflecting large production of sheets at non-integrated plants. Quotations on semi-finished material for first quarter will probably be $2 a ton above present prices.

Bolts, Nuts and Rivets

New business is holding up well and shows little change from a week ago. Additional orders from railroads for car repair programs, involving satisfactory tonnages, have been received. Takings by automobile manufacturers are quite substantial and there is reason to believe that this source will be specifying freely over the remainder of the year. It is a foregone conclusion that bolt and nut fabricators will pay more for their raw material during the first quarter of 1937 and it naturally follows that they may mark up their prices accordingly.

Bars

Price announcements are expected some time this week and there is a good chance that first quarter quotations will be up $3. When price increases are formally announced, there will be a spurt in bookings, since the majority of customers have about used up any anticipatory material booked during the latter part of September. While orders over the past few weeks have not been at a high rate, they have been much better than those placed during the first three weeks of October. Releases from automotive interests have been increasing and fresh orders from miscellaneous sources have shown a slight improvement. These factors, combined with requests for better shipments, indicate clearly that no large stocks are held by consumers. There is a better tendency to anticipate requirements further ahead, and buying practices today are more nearly approaching those existing before the depression, when delivery was of paramount importance.

Cold-Finished Bars

First quarter quotations will probably be announced some time this week and will show an increase over present prices. Meanwhile, mill backlogs have been further reduced and average around four to six weeks, depending on size and grade. Practically all producers are being pushed for shipments. New orders, while not assuming large proportions at this time, are satisfactory in view of the heavy commitments placed some time ago.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous; Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Nov. 17, 1936	Nov. 10, 1936	Oct. 20, 1936	Nov. 19, 1935
Rails, heavy, at mill	$36.37½	$36.37½	$36.37½	$36.37½
Light rails, Pittsburgh	35.00	35.00	35.00	35.00
Rerolling billets, Pittsburgh	32.00	32.00	32.00	29.00
Sheet bars, Pittsburgh	32.00	32.00	32.00	30.00
Slabs, Pittsburgh	32.00	32.00	32.00	29.00
Forging billets, Pittsburgh	39.00	39.00	39.00	35.00
Wire rods, Nos. 4 and 5, P'gh	40.00	40.00	40.00	38.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.80	1.80	1.80	1.80

Finished Steel

Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	2.05	2.05	2.05	1.85
Bars, Chicago	2.10	2.10	2.10	1.90
Bars, Cleveland	2.10	2.10	2.10	1.90
Bars, New York	2.40	2.40	2.40	2.20
Plates, Pittsburgh	1.90	1.90	1.90	1.80
Plates, Chicago	1.95	1.95	1.95	1.85
Plates, New York	2.19	2.19	2.19	2.09
Structural shapes, Pittsburgh	1.90	1.90	1.90	1.80
Structural shapes, Chicago	1.95	1.95	1.95	1.85
Structural shapes, New York	2.16¼	2.16¼	2.16¼	2.06¼
Cold-finished bars, Pittsburgh	2.35	2.35	2.35	1.95
Hot-rolled strips, Pittsburgh	1.95	1.95	1.95	1.85
Cold-rolled strips, Pittsburgh	2.60	2.60	2.60	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.60	2.60	2.60	2.40
Hot-rolled annealed sheets, No. 24, Gary	2.70	2.70	2.70	2.50
Sheets, galv., No. 24, P'gh	3.20	3.20	3.20	3.10
Sheets, galv., No. 24, Gary	3.30	3.30	3.30	3.20
Hot-rolled sheets, No. 10, Pittsburgh	1.95	1.95	1.95	1.85
Hot-rolled sheets, No. 10, Gary	2.05	2.05	2.05	1.95
Cold-rolled sheets, No. 20, Pittsburgh	3.05	3.05	3.05	2.95
Cold-rolled sheets, No. 20, Gary	3.15	3.15	3.15	3.05
Wire nails, Pittsburgh	2.05	2.05	2.05	2.40
Wire nails, Chicago dist. mill	2.10	2.10	2.10	2.45
Plain wire, Pittsburgh	2.50	2.50	2.50	2.30
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.35
Barbed wire, galv., P'gh	2.55	2.55	2.55	2.80
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	2.85
Tin plate, 100-lb. box, P'gh	$5.25	$5.25	$5.25	$5.25

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Pig Iron

Per Gross Ton:	Nov. 17, 1936	Nov. 10, 1936	Oct. 20, 1936	Nov. 19, 1935
No. 2, fdy., Philadelphia	$21.3132	$21.3132	$21.3132	$21.3132
No. 2, Valley furnace	19.50	19.50	19.50	19.50
No. 2, Southern Cin'ti	19.44	19.44	19.44	20.2007
No. 2, Birmingham†	15.88	15.88	15.88	14.50
No. 2, foundry, Chicago*	19.50	19.50	19.50	19.50
Basic, del'd eastern Pa.	20.8132	20.8132	20.8132	20.8132
Basic, Valley furnace	19.00	19.00	19.00	19.00
Malleable, Chicago*	19.50	19.50	19.50	19.50
Malleable, Valley	19.50	19.50	19.50	19.50
L. S. charcoal, Chicago	25.7518	25.7518	25.7528	25.2528
Ferromanganese, seab'd carlots	75.00	75.00	75.00	85.00

†This quotation is subject to a deduction of 38c. a ton for phosphorus content of 0.70 per cent or higher.
*The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh.	$17.25	$17.25	$17.75	$13.75
Heavy melting steel, Phila.	*14.75*	15.25	15.75	12.00
Heavy melting steel, Ch'go	16.50	16.50	16.25	13.25
Carwheels, Chicago	16.50	16.50	16.50	13.25
Carwheels, Philadelphia	16.75	16.75	16.75	12.75
No. 1 cast, Pittsburgh	16.25	16.25	16.25	14.25
No. 1 cast, Philadelphia	16.75	16.75	16.75	12.75
No. 1 cast, Ch'go (net ton)	14.00	14.00	14.00	11.75
No. 1 RR. wrot., Phila.	15.75	15.75	15.75	12.25
No. 1 RR. wrot., Ch'go (net)	14.25	14.25	14.25	11.00

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Zinc, New York	**5.42½**	5.32½	5.22½	5.22½
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Automotive interests are taking substantial tonnages and new business is coming from a variety of unclassified sources. Judging from substantial orders placed by farm implement manufacturers, the latter expect a heavy volume of sales next year. In view of higher quotations, a spurt in incoming business is expected.

Shapes and Plates

Demand for heavy plates shows a slightly better tone, but is far from satisfactory from a production standpoint. Heavy shapes are being booked at recent levels. Outstanding award of the week, involving 3450 tons, for alterations to the Emsworth dam, Emsworth, Pa., on the Ohio River, went to American Bridge Co. This company will also fabricate 1230 tons of material for a viaduct in Denver, Colo. Inquiries are out for 550 tons of plates and shapes for a shipping building at Youngstown for Republic Steel Corp.

Reinforcing Steel

Producers are being rushed on material before extreme cold weather in some parts of the country sets in. Since jobbers' stocks are low, producers expect a better volume of ordering during the winter months of this year than was the case a year ago. Carnegie-Illinois received the award of 500 tons of reinforcing steel for the Frankfort Distilleries building at Louisville, while the contract for one of this company's two buildings at Baltimore, involving 540 tons, went to Truscon Steel Co. Contract for the remaining building at Baltimore will be awarded soon.

Rails and Track Accessories

A good share of the 100,000 tons of rails purchased by Pennsylvania Railroad last week will be made in this district. There is a good likelihood that other Eastern railroads will place substantial tonnages before the first of December, the deadline on present prices. It seems likely that new price announcements on rails will take them up to $40 a ton.

Strip

Price announcements are expected some time this week. Demand in the past week has been at the same rate as the week before, with the exception of wide strip, which has eased off slightly. Within the past few days aggregate demand has picked up, probably in anticipation of higher prices for the first quarter. Automobile tonnages are being received in good volume and there has been no let-up in demand from miscellaneous sources, such as electrical appliance manufacturers, bed makers, and office furniture interests. Backlogs on hot-rolled strip are running close to three weeks with delivery about the same on cold-rolled strip.

Tin Plate

Slackening demand has brought about a drop in operations to around 89 per cent. Orders over the past week have been light and represent tonnages booked by both general line can manufacturers and some anticipated packers' requirements.

Sheets

Specifications are rolling in at a steady rate and deliveries are no better than a week ago. Heavy releases are coming from automobile manufacturers and substantial tonnages are being placed by farm implement makers. Indication of a good consumption by miscellaneous users is the steady volume of specifications being placed by jobbers, who have shown no tendency to curtail their orders. Since the majority of sheet mills in the country are practically booked to the end of the year, it is likely that new prices may become effective when announced. Even though this may not be the case, many mills will, by necessity, be out of the market long before the early part of December as enough new business will be placed to fill up any possible openings in production schedules. New prices on sheets may be $4 a ton higher than present quotations. A leading producer who had recently revised the definition of size to include only width and thickness, in the quantity differential set-up for sheets and hot-rolled strip, has reinserted length as part of the definition. One size of one grade now means a sheet of one width, one gage or thickness, and one length.

Steel Sheet Piling

Awards over the past week have been rather light, although some fair-sized tonnages are in the offing. Low bidder on the general contract for 1450 tons of piling for jetties on the Broadkill River, Rehoboth Bay, Del., is Short & Shockley, Bethany Beach, Del.

Tubular Products

No change in the steady rate of oil-country specifications has been noted. Movement of standard pipe from jobbers' stocks to consumers during October showed a slight improvement over the previous month. Specifications placed by jobbers with producers for standard pipe continue to show improvement, owing largely to increased activity in residential building throughout the country. Activity in mechanical tubing is brisk and will continue to increase since automobile companies are stepping up production schedules. Meanwhile, demand for merchant boiler tubes is fully sustained. There are signs that locomotive tubing demand will show increases soon because of current orders for locomotives.

Wire Products

Specifications for manufacturers' wire have picked up in the past week and in some cases may be attributable to anticipation of higher prices. Mills are being rushed for shipment, indicating a steady rate of consumption. While merchant wire items have not been moving as fast as manufacturers' wire, they have shown some improvement over the past week. Customers fully expect price increases and as a result are beginning to increase their volume of bookings. Meanwhile automobile manufacturers are taking substantial tonnages, while those manufacturers supplying material for building activities are counting for a fair share of total miscellaneous tonnage.

Phosphorus in Pig Iron Expounded

THE Sloss-Sheffield Steel & Iron Co., Birmingham, has collected several interesting papers dealing with the role of phosphorus in foundry pig iron and is offering a booklet on this subject to interested members of the foundry and steel industries. As pointed out in the booklet, a great amount of contumely was heaped on high-phosphorus irons in the immediate post-war period. In later years, however, numerous experiments by prominent metallurgists demonstrated that phosphorus in pig iron has a definite and most often a highly valuable function in the production of sound castings with desirable physical properties. In summarizing the work of numerous investigators, Mrs. Rebecca Hall Smith points out in the booklet that high phosphorus in iron has a tendency to increase fluidity, make castings true to pattern; it does not cause porosity when used with proper carbon content, and is influential in increasing strength, wear resistance and heat resistance. The booklet contains a treatise on phosphorus in foundry pig iron by Y. A. Dyer, a chapter entitled "The Carbon Equivalent in Gray Iron Control," by Dr. J. T. Mackenzie, and, also, a variety of tables to be used as castings analyses guide.

. . . . CHICAGO . . . .

. . . Impending advances are driving in specifications and new orders.

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. . . About 275,000 tons of rails soon to be ordered at Chicago.

CHICAGO, Nov. 17. — Ingot production has pushed upward one half point to 76½ per cent of capacity. This is due in most part to freer specifications which show the hair-trigger state of mind in which buyers find themselves as a result of the talk of higher prices. New buying is also expanding, the price urge being the underlying reason. How far this movement can go is a question, for the reason that some steel mill units are now practically filled to the end of the year and a large carryover is undesirable to producers who want to take full advantage of price advances if and when they come.

The finished steel situation is as nothing compared to the buying and specifying surge which has seized the pig iron market. New sales point to a near peak for the year and shipments already are exceeding the levels which were established in boom years of the late 'twenties.

A rail buying movement may start at any moment and bring not less than 275,000 tons into the local market. Railroad purchasing agents now know the tonnages they will buy and only formal orders stand in the way of public announcements. As a starter for this movement the Union Pacific has ordered 20,000 tons.

Specifications to mills for plates and shapes are declining at a rapid rate and prospects are that this downward swing will not be checked in the immediate future. Bars and the flat rolled products are moving faster as automobile plants come within easy reach of what may prove to be the peak of fall production.

Pig Iron

The probability of a price advance is driving new business to producers' books at a rate which will bring November close to the September peak. By the same token shipments are moving upward at the fastest rate of the year and the month's total will establish a new 12-month record. This movement is obscuring the view of actual melt, but coke movements show that it is on the upgrade. Automobile foundries expect to reach the fall peak within a week to 10 days.

Wire Products

Output is at 70 per cent of capacity, and there is very indication that this rate will be maintained close to the end of the year if not beyond Jan. 1. So far buyers have taken little direct action to protect themselves against possible price advances. Specifications from all sources are steady and liberal, thereby dispelling thoughts which prevailed early in the fall that possibly some tonnage on mill books was speculative in character. Jobbers are moving a good total volume, but their buying is still on a hand-to-mouth basis. This practice has been playing into the hands of mail order houses, which can make prompt shipment from stocks.

Plates

The Western Pacific is in the market for 11 locomotives and it is reported that the Gulf, Mobile & Northern may purchase several three-car streamlined trains. So far, this fall, the locomotive market has been more active than the car market and mills are beginning to wonder when the latter will swing forward. It is computed here that about 2000 cars are on inquiries, which are all small, ranging downward from lots of 400 units. In the meantime one railroad after another makes purchases for heavy car repairs, the Atlantic Coast line and the Virginian being the latest to join the procession. Car builders are now ordering materials for the Chicago & Eastern Illinois cars and the Burlington is starting to buy against its large shop building program. Other outlets for plates are a 5000-ton conduit near Denver and several dams across the Mississippi River.

Bars

Specifications are moving up as automobile and accessory plants press forward to what will be the fall peak of production. Road machinery manufacturers, especially those in diversified lines, are doing better, and tractor plants are still making production gains, while the general run of agricultural implement makers are well satisfied with present production. Deliveries of bars are slightly improved, though the range is still from three to four weeks.

Sheets

Some new business is being crowded into bulging order books as a result of the common opinion among buyers and sellers that prices are destined to advance in the near future. This situation is somewhat embarrassing to producers who can match into rolling schedules little more tonnage for rolling in the fourth quarter and they want to hold down carryover to a minimum. In other words, if there is a price advance, they want to take full advantage of it.

Reinforcing Bars

Large projects remain scarce, but most fabricators report a steady flow of small business and shop books show little shrinkage. Only a formal order is needed to close the 665 tons for the Museum of Science and Industry at Chicago. The Sanitary District, which has 800 tons of bars to purchase, postponed opening bids from last week to the present week. The State of Indiana will soon open bids on two bridges to be constructed in the northern part of the State.

Warehouse Business

Total orders in the first half of November are very close to the October average. This condition is contra-seasonal to the normal trend at this time of the year. Strange as it may seem, demand from country areas is on the upgrade, sufficiently so that it is offsetting the loss of city business, which is following its normal course from the October high.

. . PHILADELPHIA . .

. . . Pennsylvania buys 100,000 tons of rail.

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. . . Ingot output is steady at 55 per cent of capacity.

PHILADELPHIA, Nov. 17.—The feature of the market this week was the announcement by the Pennsylvania Railroad of the purchase of 100,000 tons of rails. The last large order for rail placed by this road was late in 1933, when a similar tonnage was ordered. The new tonnage will include approximately 36,000 tons of 152-lb. rail, which is the heaviest used on the main line high-speed tracks. The remainder of the order will consist of 131-lb. rail. It is understood that this purchase is for the purpose of allowing the railroad to continue its extensive program of renewals and the substitution of heavier rail in tracks throughout the system. Judging from past procedure, the order probably will be divided between Carnegie-Illinois Steel Corp., Bethlehem Steel Co., and Inland Steel Co.

The general business level for the first two weeks in November was slightly below that for the same period in October. The main concern of both buyers and sellers is the expected price increase; when it will be announced and how much it will be. A few customers have become alarmed on hearing a report that the price increase might be effective immediately, instead of the first of the year, and that they might not have time to cover. These, however, have been in the minority and general opinion is that the announcement will be made for next quarter before the first of December and possibly before the end of this week. Buying in anticipation of the price increase has not yet materialized to any extent, in spite of the fact that there has been much comment in the trade, as well as definite statements to the effect that an increase was bound to follow a rise in wages.

Operations in this district continue at 55 per cent of capacity.

Current pig iron sales are good, in spite of the fact that most heavy buyers are already covered for their year's requirements. Shipments are quite heavy, and in some quarters, there is talk of a serious shortage of iron. A price increase is being looked for at any moment. Meanwhile, scrap prices are tending downward, No. 1 steel decreasing 50c. and No. 2 lowered to $13.50 to $14. A firm pig iron market will doubtless affect the scrap market similarly, and most consumers, as well as dealers, look for the next price move to be upward.

Consideration of ship construction by the United States Lines, Black Diamond Lines, Calmar Lines, American South African Lines and others, is being regarded hopefully by plate sellers as a possible means by which their decreasing backlogs may be bolstered. Railroad buying, which is now rather quiet, is expected to assume large proportions in 1937, while the automobile industry is virtually assured of a big year.

Pig Iron

It has been reported that a $1 per ton advance, to be effective immediately, and another advance for the first quarter, would be announced. No definite basis has been found for this statement, but it is almost certain that there will be some kind of an increase. Accompanying reports of an impending shortage of iron come predictions that blast furnaces at Riddlesburg and Chester, Pa., may be prepared for production. Work was started some time ago at Riddlesburg with a loan from the Government, but it was not sufficient, and no more funds are available, leaving the outcome of the work at this site uncertain. Although the Chester unit has been out of blast for nearly eight years, a blast furnace expert who recently visited there reports that little needs to be done to start production. It is believed, however, that only an acute shortage would cause this furnace to resume blast. One seller reports sales running from 50 to 75 per cent over last year, while another states that stocks are being depleted gradually, since more iron is being shipped than is being produced.

Sheets and Plates

Demand for sheets remains steady, with backlogs in the various mills being quoted as from three to six weeks. There has lately been a tendency for some grades to be less actively specified, especially galvanized. Representatives of smaller mills, instead of being depressed at the prospect of added competition from Bethlehem's announced additions to sheet and strip capacity at Sparrows Point, are hopeful that more small business may come their way, the larger producer being expected to concentrate on the large tonnage orders. The new Alan Wood mill, which started up last week, will be able to handle down to 30 gage, if necessary. With the second unit, a 48 to 60 in. mill, which will be ready for rolling soon after Dec. 1, the added capicity will be about 75,000 tons annually. Almost without exception plate sellers quote less than a week for delivery. A lack of heavy buying in all directions is responsible for this slump. The two major buyers, railroads and shipbuilders, are expected to be much busier next year.

Shapes and Bars

No important structural awards were made this week. Little advance work of consequence is on the docket, highway projects scattered over the State being the most important. Bars are in good demand, the automobile industry accounting for a large part of the activity. Highway construction is the leading factor in reinforcing bars at the moment, about 200 to 300 tons being bid at Harrisburg every week for small jobs throughout the State.

Imports

The following iron and steel imports were received here last week: 2029 tons of chrome ore from the Philippine Islands; 2205 tons of chrome ore from Ceylon; 25 tons of tungsten ore from China; 250 tons of ferromanganese from Poland; 98 tons of ferromanganese and 1155 tons of pig iron from the Netherlands; 652 tons of pig iron from British India; 4 tons of steel billets, 2 tons of steel forgings, 65 tons of steel tubes, 29 tons of cold-drawn steel wire and 10 tons of steel bars from Sweden; 111 tons of steel bars, 8 tons of steel bands, 3 tons of baling wire and 149 tons of structural shapes from Belgium, and 5 tons of structural shapes from France.

. . . CLEVELAND . . .

. . . Steel production declines at Lorain and Youngstown

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. . . Chesapeake & Ohio inquires for 2000 freight cars

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. . . Buyers awaiting announcement of first quarter prices

CLEVELAND, Nov. 17.—Ingot output in the Cleveland-Lorain district declined six points to 78 per cent of capacity this week as a result of the curtailment of Bessemer steel operations in Lorain. There was a drop of one point to 74 per cent of capacity in the Youngstown district.

Republic Steel Corp. late last week blew out one of its Corrigan-McKinney furnaces in Cleveland for rebuilding and enlarging. Contracts for this were placed some time ago, but a start of the work was deferred because Republic did not want to curtail its pig iron output.

Interest is still centered in price advances on steel and pig iron for the coming quarter, announcement regarding which is expected any day. Business in finished steel continues good, showing little change in volume except in sheets, demand for which has increased.

Heavier sheet orders are coming from the motor car industry, and miscellaneous demand is very active. Very little sheet tonnage is available for shipment during the remainder of the year. Some consumers are buying in larger lots than usual, evidently in anticipation of price advances. Speculative buying of other steel products is not in evidence. Aside from sheets and cold-rolled strip, mills do not have heavy backlogs.

The Chesapeake & Ohio Railroad is inquiring for 2000 freight cars. Some rail buying is expected here shortly should a price advance be announced, the present price being effective until Dec. 1.

Inquiry in the construction field is not active. Most of the work in prospect is of a public nature. Buffalo will take bids Dec. 8 for a sewage disposal plant work requiring 2250 tons of reinforcing bars, structural shapes and piling for settling tanks, pumping station and grip tanks, these portions of project involving an estimated expenditure of $1,990,000.

Pig Iron

Sales have again increased after a lull of a few weeks. The expected price advance is the outstanding stimulus for greater activity. However, considerable new business is coming from consumers who previously had purchased only about enough iron to carry them into November or until after election. Now finding that a set-back in business has not followed election, they have again come in the market. Considerable of the present buying evidently is of a speculative character. In order not to carry over any low price iron in case of a price advance, some producers will insist that consumers take all the iron due on contracts by Jan. 1 or the contracts will be cancelled.

Sheets

New demand for sheets for early requirements is heavy and, in anticipation of price advances, some large consumers outside of the automotive field are attempting to place orders for much larger lots than they usually buy. However, one leading producer has turned down excessive purchases, advising customers that they must limit the size of their orders to the average tonnage it has received from them during recent quarters. Business in steady volume is coming from motor car manufacturers whose requirements are so heavy that they are not attempting to buy sheets to put in stock in excess of the requirements of their production schedules. Barrel manufacturers continue to take considerable steel for alcohol drums. Orders in good volume continue to come from makers of refrigerators and washing machine tubs. There is the usual seasonal slackening in the demand for galvanized sheets on which deliveries have improved. Deliveries on most other grades have become more extended.

Strip Steel

New business in fairly heavy volume was placed during the week by automobile parts makers and considerable tonnage in hot strip came from non-integrated cold rolling plants. Deliveries have become easier on hot strip, mills promising shipment in not over two weeks. Producers can take on very little more cold-rolled strip for shipment during the remainder of the quarter.

Bars, Plates and Shapes

Bars are moving well, but there seems to be little, if any, speculative purchasing in anticipation of higher prices. Mills have not accumulated enough backlogs to prevent fair deliveries. Orders for structural shapes have declined and deliveries are easier. Inquiry in the construction field is light. Some demand is developing for plates for boat repair work. Lake shipyards are expected to be quite busy during the winter on this work.

Iron Ore

Consumption of Lake ore in October amount to 4,384,809 tons, compared with 4,026,690 tons in September and with 2,910,863 tons in October, last year. Furnace stocks Nov. 1 were 30,376,560 tons and stocks at furnaces and docks 35,156,099 tons, compared with 35,115,014 tons on the same date a year ago. There were 138 furnaces using Lake ore in blast Nov. 1, an increase of seven for the month.

Ore receipts at Lake Erie ports during the season until Nov. 1 were 28,297,166 tons against 18,418,219 tons during the same period last year. These docks received 5,387,889 tons in October against 3,162,468 tons during October last year. Shipments from these docks during the season until Nov. 1 were 21,557,199 tons compared with 12,989,629 tons up to Nov. 1 last year. Balance at Lake Erie docks Nov. 1 was 4,779,539 tons compared with 5,358,668 tons on Nov. 1 a year ago.

Western Pacific is inquiring for four 2-8-8-2 type and seven 4-6-6-4 type locomotives, and will also buy one 200-ton wrecking crane.

Chesapeake & Ohio is inquiring for 1000 hopper cars, 500 all-steel box cars and 500 high-side gondola cars, all of 50 tons capacity.

Warrior River Terminal Co., Birmingham, is in the market or 20 40-ton box cars.

Gulf, Mobile & Northern is considering purchase of one or two streamlined trains of three cars each.

Louisville & Nashville has authorized an appropriation of $800,000 to air condition 80 all-steel coaches and three dining cars. Work will be carried out in company shops at South Louisville.

Pittsburgh & West Virginia has applied for authority to issue $350,000 in equipment trust certificates to purchase four locomotives at a cost of $428,941.76, from Baldwin Locomotive Works.

American Locomotive Co. has placed an order with Timken Roller Bearing Co. Canton, Ohio, for roller bearings to equip engine trucks of six steam locomotives which it will build for Toledo, Peoria & Western Railroad.

Federal Judge Davis has under advisement, following a hearing, the petition of St. Louis-Southwestern Railway to purchase boilers, frames and other locomotive parts, with which to build five locomotives of 4-8-4 type in its shops at Pine Bluff, Ark., at an estimated cost of $550,000, and to purchase 10 air-conditioned coaches to cost $500,000. The petition to buy heavy-duty machinery to cost $128,450 was granted. Bankers' Trust Co. of New York, trustee of the railroad's second mortgage bond issue, objected to payment of equipment with cash.

RAILS AND TRACK SUPPLIES

Pennsylvania has purchased 36,000 tons of 152-lb. rails and 64,000 tons of 131-lb. rails.

Wabash has been authorized to spend $165,412 as follows Replace 6.5 miles of 68-lb. rails with 98-lb. rails and fastenings, including four turn-outs near Millard, Mo., $54,686; construct 50,000-gal. steel water tank at Springfield, Ill., $10,307; track maintenance equipment, $33,731 and shop machines, $66,688.

Union Pacific Railroad has purchased 20,000 tons of 131-lb. rails and an equal amount of rail fittings. Rail order will be filled by Colorado Fuel & Iron Co., Inland Steel Co. and Carnegie-Illinois Steel Co. Order for rail fittings will be issued within a few days. A total of 350 miles of main line rails will be laid under present rail authorization in addition to 50 miles of branch line rail renewal, the latter all on North Platte branch, serving Gering territory of Union Pacific lines. Main line rails will be laid at various points in the four divisions of transcontinental lines of Union Pacific.

Simplified Practice Recommendation R163-36, covering coarse aggregates as stone, gravel and slag, has been published by the U. S. Department of Commerce and is available upon application to the Superintendent of Documents, Washington, at 5c. a copy.

Bethlehem to Build Continuous Strip Mill at Sparrows Point Plant

BETHLEHEM STEEL CO. has announced that it will spend $35,000,000 on new construction at its Sparrows Point, Md., plant between now and the end of 1937. Eugene G. Grace, president, in making the announcement, said: "This new construction is a continuation of the program started in 1935 on which $34,500,000 has been spent to date."

The equipment to be installed will consist of two parts, a continuous hot strip mill of 600,000 tons annual capacity, with its finishing end for strip sheet and light plates, and a cold rolling unit having an annual capacity of 150,000 tons for the manufacture of tin plate. The new hot mill will be 56 in. wide capable of rolling strip and sheet in widths up to 48 in. and from ½ in. in thickness down to No. 20 gage. It is pointed out by the company that this range will meet the requirements of many manufacturing demands, such as tin plate, furniture, barrels, air conditioning, automobile body parts and building materials. The new capacity will make the Sparrows Point plant one of the most important producers of sheets and strip in the country.

Mr. Grace pointed out that Bethlehem has for some time been studying the possibilities for increased production of those types of steel largely used in the fabrication of consumers' goods. The new capacity, added to the continuous strip, sheet and plate mill recently completed at its Lackawanna, N. Y., plant, will provide Bethlehem with a better balanced production between the heavier and lighter products.

"Our favorable experience with the continuous strip sheet mill at our Lackawanna plant fully justifies us in going forward with additional facilities for making this type of material," said Mr. Grace. "This mill has enjoyed steadily increasing business since it was put into production. It is anticipated that our new Sparrows Point facilities will find similar markets for light flat-rolled products in a still further diversified field.

"At the present time our new mill at Sparrows Point for the production of cold-rolled tin plate is being supplied with hot-rolled coils from the strip-sheet mill at the Lackawanna plant. The volume of business now justifies the installation of a continuous strip-sheet mill in Maryland and also the building of additional cold reducing mills and finishing facilities for production of tin plate, sheets and strip."

It is stated that the $35,000,000 appropriated for Sparrows Point improvements will not all go into new equipment, but will cover expenditures for miscellaneous reconstruction and improvement. The funds for the improvements were provided for by a recent bond issue of $55,000,000, of which $14,700,000 was for refunding purposes.

It will not be necessary for Bethlehem to increase its ingot-making capacity to provide for the additional requirements of the new finishing mills, as its ingot capacity has for some time been in excess of the requirements for its finishing mills.

Mesta to Build New Bethlehem Mills

MESTA MACHINE CO., Homestead, Pa., will produce the rolling mill equipment for Bethlehem Steel Corp.'s continuous mill at Sparrows Point, Md. Mesta will also furnish the necessary cold-reducing and finishing equipment, the exact nature of which has not yet been determined by Bethlehem. There will be two cold units, however, one for mailing sheets and strip and the other for plate for tinning. Electrical equipment has been divided between Westinghouse Electric & Mfg. Co. and the General Electric Co. It is understood that the order will be completed within the next 10 or 12 months.

Republic Steel Plans New Mill Building

REPUBLIC STEEL CORP. has taken bids for foundations for the continuous sheet strip mill that it is expected to erect in Cleveland, although no official announcement has yet been made that Cleveland has been definitely selected as the location for the mill. Plans call for 500,000 ft. or more of 12-in. pipe for supporting the foundations. Plans for the building have not yet been completed but inquiry for steel amounting to several thousands tons is expected to be out within the next two or three weeks.

. . . Awards of 3525 tons —3435 tons in new projects.

AWARDS

Queens, N. Y., 245 tons, paving and underpass, Marine Parkway Authority, to Igoe Brothers, Inc.

Cleveland, 800 tons, Easterly sewage disposal plant, to Concrete Steel Co.

Chicago, 665 tons, Museum of Science and Industry, to an unnamed bidder.

Denver, 730 tons, All-American Canal project, to Colorado Fuel & Iron Co.

Denver, 142 tons, Burnt River reclamation project, to Colorado Fuel & Iron Co.

Reno, Nev., 335 tons, Boca Dam on Little Truckee River, to an unnamed bidder.

Los Angeles, 170 tons, for United States Engineers, to Bethlehem Steel Co.

Sawtell, Cal., 436 tons, Veterans Hospital, to an unnamed bidder.

NEW REINFORCING BAR PROJECTS

Cumberland and Perry Counties, Pa., 180 tons, highway work; new bids Nov. 20.

Buffalo, 1600 tons, sewage disposal plant; bids Dec. 8.

Chicago, 800 tons, Sanitary District work; bids this week.

State of Indiana, 300 tons, bridges.

Newport Beach, Cal., 208 tons, sewage disposal system; bids soon.

Denver, 345 tons, All-American Canal project; bids opened.

Kettering Voices Faith in Future

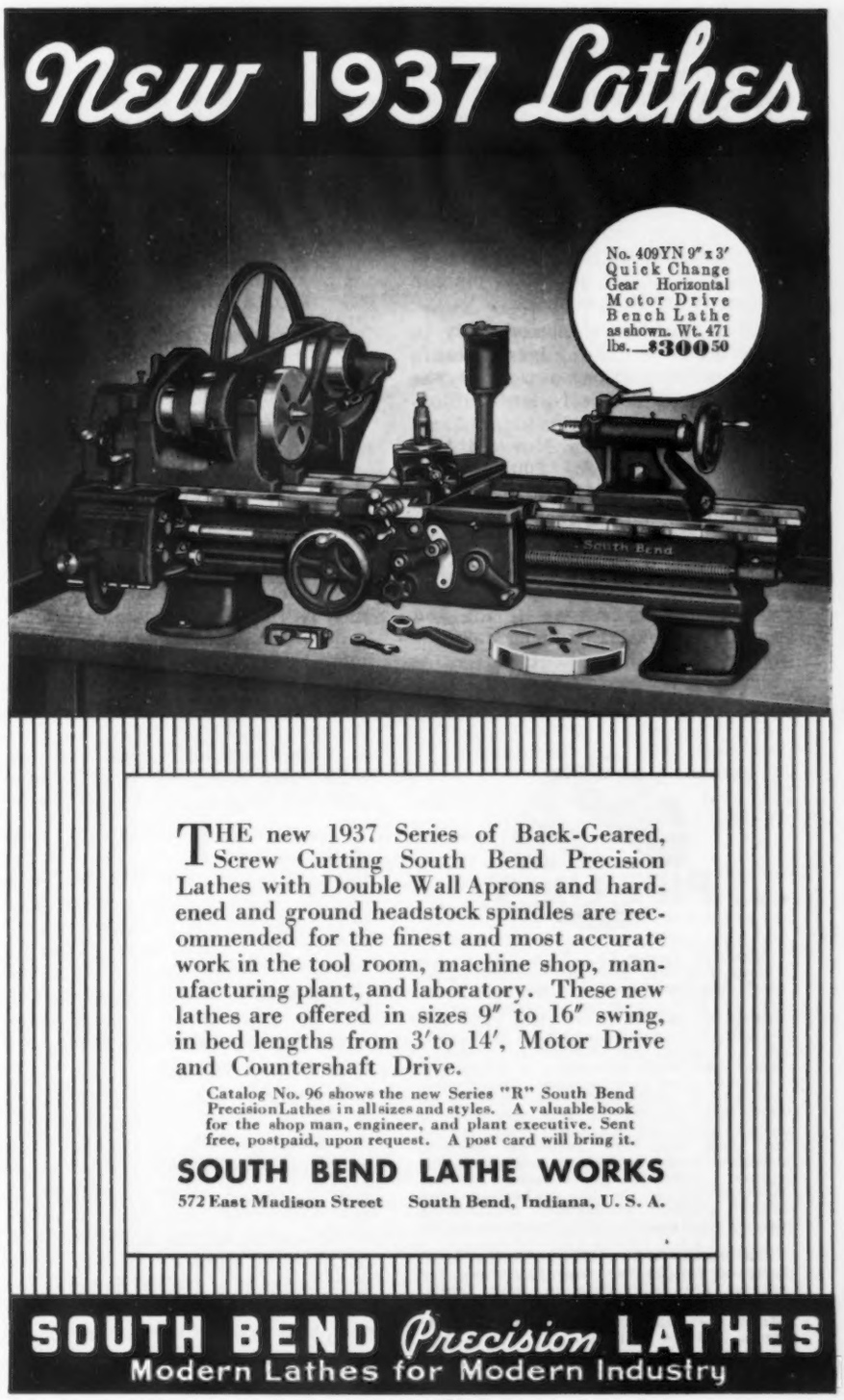
FAITH in the future progress of America was voiced by Charles F. Kettering at a luncheon at the Hotel Waldorf-Astoria, New York, on Nov. 10, given in tribute to his important contributions to the advancement of transportation by Alfred P. Sloan, Jr., president of General Motors Corp., on the occasion of the twenty-fifth anniversary of the development of the electric self-starter, which inaugurated Mr. Kettering's association with the automobile industry in 1911.

"You can't stop progress," Mr. Kettering told the 300 industrialists, scientists, editors and educators gathered to honor his achievements, "unless human mentality stops. Twenty-five years from now the cars of 1937 will look as antiquated as the cars of 1912 do today. We know so little about anything in the world ahead of us, but if I could get into the minds of young people today, I would get them to quit looking backward and look forward instead; then I would have no fear for future generations."

Pointing out that the individual is not the leading factor in progress today, Mr. Kettering stressed the importance of the research group and defined research as "nothing but looking forward to see in which direction industry may or may not go."

"We must regard research entirely as an insurance policy. In doing research work on something that has never yet been done, there is no possible way in which to forecast how much it is going to cost and when it is going to be done, or how much it is going to be worth if and when it is finished.

"You will have to take these things on faith. And faith and patience are the two fundamentals upon which all research organizations are built."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....BUFFALO....

. . . Steel production is increased.

o o o

. . . Pig iron shipments very satisfactory.

BUFFALO, Nov. 17.—Republic Steel Corp. increased its open-hearth activity to seven units the past week; Lackawanna plant of the Bethlehem Steel Co. is operating 23 and Wickwire-Spencer Steel Co. has two on. Preparations for the opening of six new open-hearths at Bethlehem's Lackawanna plant are going ahead, with the new unit due to be lighted about Jan. 1. This will give this plant a capacity of 30 furnaces.

Bids will be called for early in December on the superstructure and sedimentation section of the new sewage disposal plant in Buffalo to require 1600 tons of reinforcing bars. On Nov. 24 bids will be opened for 200 tons of fabricated structural for bridges in Wyoming and Chautauqua counties.

Pig iron business indicates the same satisfactory specifications against old orders as during the past few weeks. Foundries definitely are busy throughout the entire territory. Blast furnace operations are unchanged.

....PIPE LINES....

Montana Power Co., Butte, Mont., has arranged to take over and operate welded steel pipe line systems of Montana Power Gas Co., Butte, used for natural gas transmission from Cut Bank, Mont., gas field to Butte and vicinity, and from Dry Creek, Mont., natural gas district to Bozeman, Mont., and plans extensions and improvements in lines and facilities. Purchasing company is organizing a subsidiary to acquire and operate oil and gas-producing properties of gas company noted, including steel pipe line gathering systems, gasoline extraction plant and other facilities, and plans increased output. Montana Power Co. has authorized bond issues totaling $58,589,000, considerable part of fund to be used for purposes noted.

Cut Bank, Mont., is considering bond issue of $31,000 for steel pipe lines for natural gas distribution in town limits, comprising new system or purchase of existing lines and extensions and replacements in these facilities.

Monmouth, Ore., plans about 9300 ft. of 8-in. for main water line to replace present old pipe lines. Financing is being arranged through Federal aid.

Cass-Liberty Gasoline Co., First National Bank Building, Dallas Tex., plans welded steel oil pipe line from Rodessa, La., oil field district to new gasoline plant in Cass County, northern Texas, about 12 miles distant. Dudley S. Golding is president.

Vicksburg, Miss., closes bids Dec. 1 for welded steel pipe line from city limits to State-owned gas fields at Jackson, Miss., about 36 miles, for natural gas transmission; also for steel pipe line distribution system in municipal limits. Fund of $300,000 has been secured through Federal loan and grant; total cost estimated about $330,000. H. L. Miller, Vicksburg, Miss., is engineer.

Dominion Natural Gas Co., 957 King Street East, Hamilton, Ont., plans steel pipe lines at Port Colburne, Ont., for natural gas distribution in city limits, replacing a number of present lines. Award for pipe has been made to Page-Hersey Co., Welland, Ont.

CANADA

. . . Britain buying munitions and airplanes in Dominion.

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. . . Domestic iron and steel business expanding.

TORONTO, Ont., Nov. 17.—Substantial munitions orders will be placed in Canada by the British Government. It is understood that Dominion Steel & Coal Corp., Sydney, N. S., already has closed large orders for Britain, and announcement has been made that the Canadian Car and Foundry Co. has received good orders for airplanes. At the same time there has been a steadily growing demand for practically all lines of iron and steel for domestic consumption.

Demand for merchant pig iron, while without special feature for the past week, was sustained, with awards holding better than 1200 tons. Melters are placing frequent orders and some have taken in stocks to carry them to the end of the year. Pig iron production also is holding at a high level, while imports are slow. Prices are firm and unchanged.

Trading in iron and steel scrap is active. While principal call is for steel grades, there also is a good market for iron scrap. Local dealers report large shipments of heavy melting steel and turnings to the mills in the Hamilton district, while Montreal dealers state that there is a strong demand for heavy melting steel for local consumption and shipments are being made to the Nova Scotia mills. Prices are firm and unchanged.

..CAST IRON PIPE..

Elm Hill Water District, Auburn, Mass., plans pipe lines for water system in Packachoag Hill district. Cost about $50,000. Financing is being arranged through Federal aid.

Board of Baltimore County Commissioners, Towson, Md., closes bids Nov. 23 for 16,050 ft. of 6, 8 and 12-in., for extensions in water system in Belair Road and other highways. Samuel A. Green is chief engineer.

Lyons, Ind., asks bids until Nov. 30 for pipe for water system and other waterworks installation. Municipal Engineering Co., Plainfield, Ind., is consulting engineer.

Oelwein, Iowa, closes bids Dec. 8 for 4200 ft. of 12-in., and 500,000-gal. elevated steel tank on 150-ft. steel tower. Cost about $50,000. E. E. Schenk, 132 Lovejoy Street, Waterloo, Iowa, is consulting engineer.

Gulf Water Supply District, H. L. Atkinson, Beeville, Tex., president, has secured PWA approval of water project in Gulf Coast area, including main pipe line from point near New Braunfels, Tex., for supply, with pipe line water systems in municipalities in several counties. Elevated steel tanks and towers will be located in different centers. Entire project will cost $8,800,000. Financing will be arranged through Federal aid.

Van Alstyne, Tex., plans about 13,500 ft. of 2, 6 and 8-in., for extensions in water system. Cecil Miller is city engineer.

Jackson County Public Water District No. 1, Grandview, Mo., John N. Maddin and Jerome Walsh, Bryant Building, Kansas City, Mo., attorneys and representatives, will take bids soon for pipe for water system in district near Grandview, covering about 33 sq. miles, including main trunk line from point near Kansas City for supply; also for 250,000-gal. steel tank on 100-ft. steel tower. Fund of $327,000 is being arranged through Federal aid. Charles A. Haskins & Co., Finance Building, Kansas City, Mo., are consulting engineers.

Bucklin, Mo., has voted bonds for $25,000 as part of $40,000 appropriation being secured through Federal aid for pipe lines for water system, including elevated steel tank and tower. W. B. Rollins & Co., Railway Exchange Building, Kansas City, Mo., are consulting engineers.

Beverly Hills, Cal., will take bids soon for about 18,000 ft. of various sizes for extensions in water system in Santa Monica and Sunset Boulevards, Palm Drive, Lomitas Avenue and other streets; also for two underground steel water tanks in Coldwater Canyon and West Hollywood districts, respectively. Fund of $92,850 has been arranged, partially through Federal aid. Arthur Taylor, 725 South Spring Street, Los Angeles, is consulting engineer.

Medical Lake, Wash., plans about 9000 ft. of 4, 6 and 8-in., to replace present main water transmission and auxiliary distributing lines. Financing is being arranged through Federal aid. A. R. Scott, Hutton Building, Spokane, Wash., is consulting engineer.

Atwater, Cal., has opened bids on 450 tons of 4 and 10-in. pipe for a water system.

Safford, Ariz., will open bids Nov. 23 on 576 tons of 2 to 10-in. pipe for a water system.

United States Pipe & Foundry Co. is low bidder on 101 tons of 4 and 6-in. for Lemon Grove and Spring Valley Irrigation project.

. . . . NEW YORK. . . .

. . . Uncertainty rules as price advances are delayed.

o o o

. . . Heavy steel markets display considerable promise.

o o o

. . . Upward of 25,000 tons of plates for pipe line.

NEW YORK, Nov. 17.—Thoroughly convinced that broad price advances are imminent, all classes of consumers are seeking a moderate degree of protection. Most sellers, however, are exhibiting a marked restraint in booking new business, particularly for those grades of steel which currently show a four to five week lag in deliveries. A consensus of steel sales offices indicates that a Dec. 31 deadline for deliveries on orders at present price levels will be held firm—that is, consumers will not be favored with a liberal interpretation of the "delivery at mill convenience" rule, as has been the case in several previous price advances.

Most users of steel are anxious for early price announcements so that plans can be made for first quarter requirements. That principal steel makers will make these announcements this week is almost a certainty. Semi-finished probably will go up $2 a ton, bars may rise $3, although a $2 advance seems more likely, and of even greater importance is the fact that several sellers are talking of a $4 rise on sheets.

The Pennsylvania Railroad last week ordered 100,000 tons of rails. Another eastern carrier, the New York Central, is in the market for upward of 50,000 tons of rails. A mile-long bulkhead along the East River will take over 3000 tons of piling. Alco Products, Inc., is in the market for from 25,000 to 35,000 tons of plates for riveted pipe. Maryland Drydock Co., Baltimore, has been awarded three Pennsylvania car floats, and the 1000 tons of plates involved has already been placed with a mill. American Locomotive Co. is buying steel for 20 Union Pacific locomotives it recently booked, and the steel for the western Maryland car requirements is expected out shortly. A sizable volume of shipbuilding is currently under construction, but little definite action is expected until after the first of the year.

There has been no noticeable seasonal decline in sheet jobbing business in this area.

At the moment, foreign steel is less of a factor in this market than has been the case in past months.

Initial lettings of piling for the New York World's Fair are anticipated early in the new year.

Pig Iron

The Eastern market continues to reflect an active rate of consumption. Winter shortage of iron is possible if shipments show no let up. Producers are expected to make an announcement regarding prices before the end of the week.

Reinforcing Steel

The price structure appears to be firming gradually, although the softness is by no means entirely eliminated. Few large jobs have been reported recently and, although inquiries have been numerous, it is believed that few jobs of over 100 tons are in sight for the remainder of the year. The bulk of the tonnage being received at present is due to small construction projects, alterations and additions to industrial plants, and road work. General feeling is that a price advance of from $2 to $4 a ton will be announced soon. Igoe Brothers was awarded 245 tons for a Marine Parkway Authority project in Brooklyn. Two highway projects in Pennsylvania requiring a total of 181 tons will be up for bids Nov. 20.

. . SAN FRANCISCO . .

. . . Pipe line to take 20,000 tons of plates.

o o o

. . . Floating dry dock to go ahead soon.

SAN FRANCISCO, Nov. 16.—Among the larger new projects pending is the second unit of the Crystal Springs pipe line near Burlingame, Cal., in which 24,620 lineal feet of 60-in. pipe requiring approximately 20,000 tons of plates will be used. Bids will be opened Dec. 9. On Nov. 25 bids will be opened on the Pearl Harbor, T. H., floating drydock, to be built somewhere on the Pacific Coast; 22,636 tons of plates and 6849 tons of shapes are involved in this $15,000,000 project.

Funds have been allotted by the PWA for reconstruction of Municipal Terminal No. 1 in Portland, Ore. Total cost is estimated at $868,978. The completed pier will have an over-all length of 1285 ft. and width of 484 ft.

Opening of the San Francisco-Oakland Bay bridge held the attention of the Bay Region last week. After four years of continual work, the bridge was opened to the public Nov. 4. The project involved nearly 200,000 tons of steel, of which 152,000 tons was structural and 30,000 tons was reinforcing bars.

Awards for the week were practically non-existent as steel companies and prospective builders alike watched the progress of arbitrators in the now two weeks old dock strike. Warehousemen's unions reached a satisfactory agreement with their employers and Government officials optimistically forecast this move as a successful step in settlement of strikes still in effect. In the meantime steel mill production was not hindered.

. . . Scrap dealers see revival of buying.

o o o

. . . Pig iron sales in restricted volume.

BOSTON, Nov, 17.—There appears to be a decidedly better feeling in the scrap market. Pittsburgh mills have bought some additional material, and there has been a renewal of buying by the Worcester mill, which has been out of the market for some time. Scrap dealers have not accumulated very much material, as their yards were kept almost bare during the early part of the year because of heavy export trade. Conditions in the trade are regarded as favorable for a firmer price structure; in fact, there was a slight hardening of prices in the past week in skeleton, turnings and some other lines.

Pig iron sales were not large, as many foundries had covered for nearby requirements prior to the recent advance of $1 a ton by the Mystic furnace, and books are not open as yet for the first quarter.

. . . Sheet bookings filling up mills for quarter.

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. . . Pig iron buying gains, anticipating price increase.

CINCINNATI, Nov. 17.—Order books of nearby sheet mills are filling rapidly. In fact, operators indicate that if demand continues at the present rate, about 10 days will bring full commitment of mill capacity for the quarter and require the refusal of further business. This is particularly true of hot-rolled annealed sheets in which rolling schedules are likely to be filled this week. Sheet consumers are in the market for future needs, bringing current bookings to about 125 per cent of mill capacity. Price advances became more certain in the light of the general feeling throughout the trade that an increase is necessary to cover wage alvances.

Heavy demand for finished sheets is reflected in the near-capacity operations of steel ingot producers. The average is steady at about 93 per cent, with 32 out of 34 furnaces in operation.

Reports of a price increase in pig iron have stimulated heavier anticipatory buying. New business the past week totalled slightly above the recent average of 2000 tons. Of course, a substantial portion of this is still in 100-ton lots, but furnace interests report several sales of 300 to 500 tons. Foundry operations are up a few points, but full capacity has not yet been reached.

Overspecification of foundry coke in October to build stocks against cold weather shortages retards current shipments except to automotive melters. New business for industrial sizes is not large, but domestic demand is good.

. . . November pig iron shipments heavy.

o o o

. . . New buying movement expected in steel.

ST. LOUIS, Nov. 17.—Increases in the prices of finished iron and steel are expected for the first quarter of 1937, and so a heavy buying movement is being looked for in December. In the meantime business continues active, although not quite so brisk as a month ago. Buying of sheets by the stove trade continues good. State highway projects are becoming slightly more active, Missouri scheduling a letting of 1060 tons of structural shapes for three bridges on Dec. 1. Awards of reinforcing bars to mills have been mostly small jobs during the last two weeks. Wire products and roofing are moving a little better.

The Wabash Railway has been authorized by the Federal Court to expend $165,413, including replacing of 6.5 miles of 68 lb. rail with 98 lb. rail and fastenings, and four turnouts near Millard, Mo., to cost $54,686, and to construct a 50,000-gal. steel water tank at Springfield, Ill., to cost $10,307.

Pig iron shipments are being maintained at a high rate, and it seems likely that the November movement will exceed that of October, which was the best month of the year. Buying continues in the belief that higher prices will be established shortly. The stove foundries in the Belleville district are beginning slightly to curtail operations, with further curtailment after Dec. 1 planned, although operations will continue on a much larger scale than usual right up to Christmas. Reports from the agricultural implement makers in the northern part of Illinois are that operations again are near the peak. Job foundries generally are busy.

. . . New business flows in at a steady rate.

o o o

. . . Foundries buying pig iron, anticipating price rise.

BIRMINGHAM, Nov. 17.—New orders for iron and steel continue to flow in at a steady and substantial rate. Production is probably at the highest point in more than five years, and the same is likely true of backlogs. Business now on hand and in immediate prospect is sufficient to assure production at a high rate for some months. An active and satisfactory first quarter is already a certainty. All units of the various steel mills are extremely busy. Some are at full capacity.

With a pig iron price increase certain at an early date, foundries are returning to the market to book additional iron, even though their requirements for the quarter have already been placed. There will be considerable iron bought and accepted this quarter which will go into yard stocks for use during the next quarter. The furnace companies have not yet indicated what the increase will be or when it will take place. However, it is likely that a raise of $1 will be made within the next week.

All iron and steel companies made wage advances on Nov. 16. These range around 10 per cent. In the Birmingham district more than 20,000 men were affected and the increase will total more than $2,-

250,000 annually. Wage increases were also granted by a number of fabricators, pipe plants and others.

Sixteen open hearth units and 13 blast furnaces are in operation. This was the schedule last week and will again be followed this week.

Hardaway Contracting Co., Columbus, Ga., was the low bidder for the new dam and lock on the Warrior River at Tuscaloosa, Ala., with a bid of $3,441,282.61. This firm built lock 17, in 1915, the largest lock and dam on the Warrior River.

Virginia Bridge Co. has booked 850 tons of structural steel for the new plant of the Monsanto Chemical Co. at Columbia, Tenn.

Gulf States Steel Co. has not yet announced its new improvements but may do so in the next few weeks, now that its new financial plan is in operation. Additional open-hearth capacity, as well as a tin plate mill, may be built.

..GREAT BRITAIN..

. . . Steel and pig iron put at new high levels.

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. . . Mills working full time and planning new production.

o o o

. . . Continental export prices raised on some items.

LONDON, Nov. 17 *(By Cable).*—British steel production reached a new high record with 1,060,500 tons for October, while pig iron reached 670,300 tons, the highest peak for that commodity in years. Makers are accepting further orders only for distant delivery. The suggested price advance for pig iron has been temporarily abandoned as it offers no advantage in view of the fact that practically all output is sold up to the end of the year and in forward contracts a "rise and fall" clause is permissible.

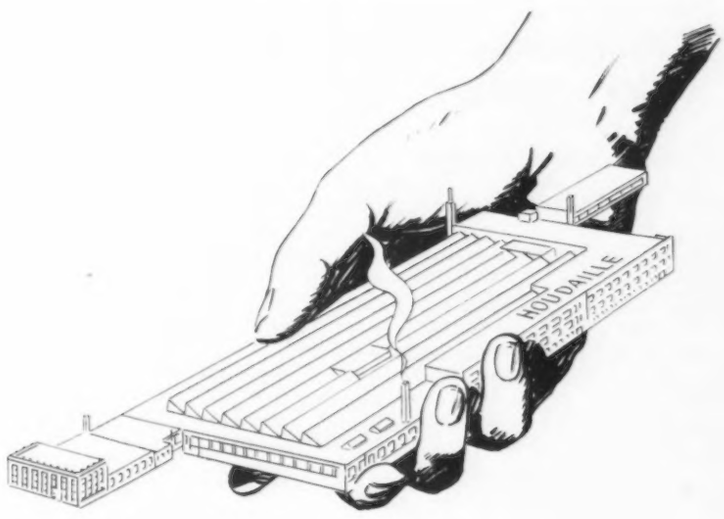
Steelmakers are working full time and are rushing new units into production. An inadequate supply of domestic billets is necessitating an increase in imports. Deliveries of heavy steel, especially structural, are in arrears. Overseas demand is improved.

There is a rumor that the meeting of the International Tin Plate Cartel will be held in about three weeks when a price advance is highly probable. Meantime, considerable tonnages are being hooked, mainly for export, at 6d. to 9d. above the scheduled price.

Continental iron and steel continues active. October exports of pig iron amounted to 9100 tons, of which 60 tons was shipped to the United States. Total exports of iron and steel amounted to 194,000 tons.

Continental reports state that Continental gold export prices on plates, thick sheets and flat billets were raised 1s. 6d. except in certain markets, which include the United States. Sterling price of shipplates was advanced 5s.

British and Continental general export price on block and galvanized sheets was raised 5s. All other British prices remain unchanged.



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FABRICATED STEEL

. . . New projects advance to 12,700 tons as against 9250 tons a week ago.

o o o

. . . Plate lettings call for 1075 tons, with 55,000 tons pending.

NORTH ATLANTIC STATES

Chesterfield, N. H., 700 tons, Connecticut River bridge, to Bethlehem Steel Co.

New York, 240 tons, Triborough bridge passageways, to American Bridge Co.

Albany, N. Y., 230 tons, warehouse, National Casket Co., to Clausen Iron Co., Inc., Albany.

Onondaga County, N. Y., 545 tons, highway bridge, to Phoenix Bridge Co., Phoenixville, Pa.

Newark, N. J., 120 tons, Joseph H. Reinfeld distillery, to H. R. Goeller, Inc., Hillside, N. J.

Lancaster, Pa., 245 tons, Hamilton Watch Co. building, to A. B. Rote Co.

Philadelphia, 150 tons, addition to SKF Industries, to Robinson Iron & Steel Co., Philadelphia.

Emsworth, Pa., 3450 tons, alterations to Emsworth dam, Ohio River, to American Bridge Co.

SOUTH AND SOUTHWEST

State of West Virginia, 110 tons, Department of Agriculture, three beam bridges, to Bethlehem Fabricators, Inc.

Pickwick Dam, Tenn., 235 tons, TVA requirement, to Lackawanna Steel Construction Co., Buffalo.

State of North Carolina, 610 tons, Riverbend steam station, to Ingalls Iron Works Co.

Winchell, Tex., 360 tons, Colorado River bridge for St. Louis-San Francisco Railroad, to American Bridge Co.

Fort Worth, Tex., 240 tons, Rock Island railroad truss span, to American Bridge Co.

CENTRAL STATES

Ann Arbor, Mich., 135 tons, extension to University of Michigan union building, to Whitehead & Kales Co., Detroit.

Dover, Ohio, 220 tons, boiler house, to Burger Iron Co., Akron, Ohio.

Ashtabula, Ohio, 330 tons, bridge, to Fort Pitt Bridge Works Co., Pittsburgh.

Cincinnati, 263 tons, transmission towers for Ohio River crossings for Columbia Gas & Electric Co., to Blaw-Knox Co., Blawknox, Pa.

Chicago, 130 tons, Chicago & Great Western Railroad girder spans, to American Bridge Co.

Bowman County, N. D., 180 tons, bridge, to Illinois Steel Bridge Co., Jacksonville, Ill.

Rapid City, S. D., 160 tons, Sioux sanitorium, to Crown Iron Works Co., Minneapolis.

WESTERN STATES

Hurricane, Utah, 520 tons, Virgin River bridge, to Bethlehem Steel Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

North Haven, Conn., 200 tons, grade crossing elimination.

Brooklyn, 2000 tons, stock houses, Schaefer Brewing Co.

Buffalo, 300 tons, sewage disposal buildings; bids Dec. 8.

Wyoming and Chautauqua Counties, N. Y., 200 tons, State bridges; bids Nov. 24.

Philadelphia, 400 tons, crane runway for Navy Department.

West Leechburg, Pa., 600 tons, highway bridge.

Washington, 374 tons of angles and shapes for three submarines, two to be constructed at Portsmouth, N. H., Navy Yard, and one at Mare Island yard. Bids will be opened Nov. 27 by Bureau of Supplies and Accounts, Navy Department, Washington.

SOUTH AND SOUTHWEST

Blountstown, Fla., 4000 tons, bridge; Wisconsin Bridge & Iron Co., North Milwaukee, low bidder.

State of Mississippi, 525 tons, bridges.

Parker, Ariz., 300 tons, Colorado River bridge.

CENTRAL STATES

Kent, Ohio, 150 tons, extension for Twin Coach Co.

Youngstown, 550 tons, shipping building for Republic Steel Corp.

Ashtabula, Ohio, 250 tons, turbine supports for Cleveland Electric Illuminating Co.

Lafayette, Ind., 900 tons, highway bridge.

Schererville, Ind., 430 tons, highway bridge.

Indianapolis, 2000 tons, interurban car sheds and office buildings; bids Dec. 7.

Chicago, 750 tons, Cicero Avenue bridge; bids Nov. 20.

Minot, N. D., 220 tons, overhead bridge.

Red Wing, Minn., 1000 tons, dam across Mississippi River.

Austin, Minn., 610 tons, bridge.

State of Missouri, 1060 tons, following highway projects: Oakland Avenue bridge, St. Louis, 280 tons; Ballas Road crossing, St. Louis County, 210 tons; Lake of the Ozarks bridge, Benton County, 570 tons; bids Dec. 1.

St. Louis, 350 tons, plant addition for Rubberoid Co.

WESTERN STATES

Denver, 266 tons, three State highway bridges; bids opened.

FABRICATED PLATES

AWARDS

New York, 777 tons, 24 tanks for Barrett Co., for erection in Massachusetts and Maine, to Chicago Bridge & Iron Works, Chicago.

Wards Island, N. Y., 155 tons, tanks, sewage treatment, to Graver Tank & Mfg. Co., Inc., East Chicago, Ind.

Baltimore, 135 tons, Gulf Oil Corp. barge, to Pusey & Jones, Wilmington, Del.

NEW PROJECTS

New York, 25,000 to 35,000 tons, riveted pipe for Alco Products, Inc.

Denver, 5000 tons, conduit; Williams Brothers, Tulsa, Okla., low bidders.

San Francisco, 20,000 tons, second unit of Crystal Springs pipe line; bids Dec. 9.

SHEET PILING

AWARDS

Ashton, Idaho, 400 tons, Grassy Lake dam, to an unnamed bidder.

NEW PROJECTS

New York, 3000 tons, bulkhead about one mile long in East River.

Lewes, Del., 1500 tons, United States Engineers office.

Buffalo, 450 tons, sewage disposal plant; bids Dec. 8.

. . . GERMANY . . .

HAMBURG, Germany (Special Correspondence). — According to the latest reports of the Steel Cartel, the unfilled orders of the steel industry are sufficient now for uninterrupted work of four months at the present rate of nearly 1,800,000 tons a month, whereas at the same time last year, working at the rate of 1,400,000 tons a month, the industry had unfilled orders only for two and a half months.

The machinery industry of Germany has orders in hand for five months' work.

An interesting development in the stainless steel industry is a third reduction in prices this year. It is expected that lower prices will stimulate increased consumption.

The number of blast furnaces active in Germany during October was 116. In the first seven months of the year 106 or 107 were utilized, with a rise to 109 in August, 111 in September and 116 in October. Existing furnaces number 173, of which 23 are out of blast, while others are banked or undergoing repairs. Some are ready to go into blast whenever required.

. . .NON-FERROUS. . .

. . . Lead market advances $2 a ton on heavy buying.

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. . . Domestic zinc price is lifted 10 points to 5.05c.

NEW YORK, Nov. 17.—Domestic copper buying was in quiet volume last week as a consequence of previous heavy sales to consumers. The price continued unchanged and firm at 10.50c. a lb., Connecticut Valley. Modest bookings yesterday totaled 699 tons, and the month's running total rose to 81,573 tons. While export quotations are considerably lower than when last reported, at present levels demand from abroad is reported active. Prices secured on this business during the morning ranged between 10.55c. and 10.57½c., c. i. f., European ports. Speculative interest in the red metal is believed to be less pronounced than has recently been the case.

Lead

Continued heavy flow of business in lead forced prices $2 a ton higher yesterday to 5.05c. a lb., St. Louis basis, and 5.20c., New York. St. Joseph Lead Co. held to its $1 a ton premium on Eastern orders, placing its New York quotation at 5.25c. Inquiry for the metal has remained active at the higher price level, and continuance of demand is looked for until buyers complete December coverage at least. Requirements for this position are now about 60 per cent filled.

Zinc

Domestic zinc prices were lifted 10 points late yesterday to 5.05c. a lb., East St. Louis, coincident with the increase in the lead market. While demand was not especially heavy prior to the advance, producers began limiting offers at 4.95c. and gradually a situation came about in which consumers had to pay $2 a ton more for required tonnages. The advance was prompted by the heavily sold position of zinc producers and by the knowledge that production costs were rising. Bookings for the week came to roughly 11,000 tons and shipments bordered on 6000 tons. Inquiry for tonnage at the higher level prevailing today is reported moderate. Ore and concentrate prices have been increased 50c. to $31 for flotation and $32 for mill grade.

Tin

Tin prices were irregular during the week, and buyers came into the market intermittently. While the market here closed down for Armistice Day, business proceeded in London as usual. The New York spot Straits quotation on Nov. 11 was therefore nominally about 52.40c. a lb. Tin prices were down on this day due to the announcement that production quotas had been boosted to 105 per cent, but subsequently consumers discounted the news and demand was resumed. On the whole, the market tended to follow an erratic course during the week, both as to price and demand fluctuations. The New York spot Straits quotation today is 51.87½c. London standard prices are £231 10s. cash and £230 15s. three-months. The eastern price is reported at £230.

Ingot Brass and Bronze

Average prices received during the 28 days ended Oct. 30 by members of the Non-Ferrous Ingot Metal Institute on commercial 80-10-10 and commercial 85-5-5-5 brass ingots were 11.044c. and 9.520c. a lb. respectively. These were fractionally lower prices than were received in the preceding 28-day period.

The Week's Prices. Cents Per Pound for Early Delivery

	Nov. 11	Nov. 12	Nov. 13	Nov. 14	Nov. 16	Nov. 17
Electrolytic copper, Conn.*	....	10.00	10.50	10.50	10.50	10.50
Lake copper, N. Y.	....	10.12½	10.62½	10.62½	10.62½	10.62½
Straits tin, Spot, New York	‡52.40	52.50	53.25	....	51.65	51.87½
Zinc, East St. Louis	....	4.95	4.95	4.95	4.95	5.05
Zinc, New York†	....	5.32½	5.32½	5.32½	5.32½	5.42½
Lead, St. Louis	....	4.95	4.95	4.95	5.05	5.05
Lead, New York	....	5.10	5.10	5.10	5.20	5.20

* Delivered Connecticut Valley; price ¼c. lower delivered in New York.
† Includes emergency freight charge.
‡ Nominal.

Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb. delivered.
Aluminum, No. 12 remelt No. 2 standard, in carloads, 16.75c. a lb. delivered.
Nickel, electrolytic, 35c. to 36c. a lb. base refinery, in lots of 2 tons or more.
Antimony, Asiatic, 12.50c. a lb., New York.
Quicksilver, $88.50 to $92.00 per flask of 76 lb.
Brass ingots, commercial 85-5-5-5, 10.75c. a lb., delivered; in Middle West ¼c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	54.00c. to 55.00c.
Tin, bar	56.00c. to 57.00c.
Copper, Lake	11.50c. to 12.50c.
Copper, electrolytic	11.50c. to 12.50c.
Copper, castings	10.75c. to 11.75c.
*Copper sheets, hot-rolled	17.75c.
*High brass sheets.	15.87½c.
*Seamless brass tubes	18.12½c.
*Seamless copper tubes	18.25c.
*Brass rods	13.87½c.
Zinc, slabs	5.75c. to 6.75c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.25c.
Lead, American pig.	5.75c. to 6.75c.
Lead, bar	6.75c. to 7.75c.
Lead, Sheets, cut	8.75c.
Antimony, Asiatic	13.00c. to 14.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, ½ and ½	31.00c. to 32.00c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

* These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33⅓ per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	55.75c.
Tin, Bar	57.75c.
Copper, Lake	11.50c. to 11.75c.
Copper, electrolytic	11.50c. to 11.75c.
Copper, castings	11.25c. to 11.50c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig.	5.90c. to 6.10c.
Lead, bar	8.50c.
Antimony, Asiatic	15.00c
Babbitt metal, medium grade	20.25c.
Babbitt metal, high grade	60.75c.
Solder ½ and ½	31.75c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal).

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	7.75c.	8.50c.
Copper, hvy. and wire	7.62½c.	8.12½c.
Copper, light and bottoms	7.12½c.	7.62½c.
Brass, heavy	4.75c.	5.37½c.
Brass, light	4.00c.	4.75c.
Hvy. machine composition	6.75c.	7.25c.
No. 1 yel. brass turnings	5.75c.	6.25c.
No. 1 red brass or compos. turnings	6.37½c.	6.87½c.
Lead, heavy	4.00c.	4.37½c.
Sheet aluminum	13.25c.	14.75c.
Zinc	2.50c.	2.87½c.
Cast aluminum	12.12½c.	13.25c.

IRON AND STEEL SCRAP

. . . Composite drops to $16.17 a gross ton.

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. . . Principal markets retain strength although buying continues to lag.

CONSUMER buying is still conspicuously absent in all major districts. Nonetheless, prices are generally holding remarkably steady, undoubtedly on the strength of an expected return of widespread demand over the turn of the year. Mills are now assured of sustained operations throughout the next two or three months, and this factor, together with typical delays in deliveries during the winter months, is counted on by most brokers to add materially to the value of their present holdings. For the same reasons there is a general disinclination to sell important tonnages for delivery very far forward.

At Buffalo a temporary shortage is reported, and in eastern Pennsylvania the No. 1 price has been marked down in sympathy with recent direct purchases by Bethlehem. Reflecting this decrease the composite figure is off 16c. to $16.17 a gross ton. Weakness in the Cleveland area continues, Pittsburgh is uncertain but generally firm and New York is down fractionally in the absence of new export business.

Pittsburgh

Although the market undertone continues strong, no substantial consumer purchases of No. 1 steel have been made in the past week. Nevertheless, steel is not coming out very freely and while odd cars bring $17, $17.25 is also being paid. The quotable range for heavy melting steel, $17 to $17.50, is substantiated by an $18 figure recently paid for the railroad grade. The main feature of the local market is the exceptional strength of specialties, quotations of which are up 50c. to $1. Not only are local steel foundries working at capacity, but one company plans to open its old plant at Verona, Pa., on Jan. 1 and will consume approximately 1500 tons of specialties a month. A development becoming more pronounced is the disposition on the part of some scrap consumers to buy for forward delivery.

Chicago

Weak and strong elements about balance in this market, and it cannot be determined at this time which way prices will move. Lake navigation is coming to a close after the largest water movement of scrap in many years. This fact and the approach of winter weather should be factors tending to add strength to the market. In favor of present price levels are the steady figures being obtained by railroads and yard dealers for steel mill grades. There remains an insistent demand for most specialties, which are being taken by users as fast as they appear in the market. Railroad offerings are light this week.

Cleveland

With somewhat more liberal offerings, prices on heavy melting steel scrap have declined 25c. a ton. Other grades are unchanged. Blast furnace grades remain firm. Prices are down 25c. to 50c. a ton in the Youngstown district. New consumer demand is lacking and brokers do not look for much business during the remainder of the year. A great deal of scrap from the upper Lakes is reaching Lake Erie ports by water, shipments being rushed in order to get them cleaned up before the closing of navigation.

Philadelphia

No. 1 steel is marked down 50c. this week to $14.50 to $15 in sympathy with sales within or below this range at Bethlehem. No. 2 steel is now quoted at $13.50 to $14. Present prices are not bringing out much material, and, in some places, an actual shortage is reported. Most buyers and sellers profess to believe that the next market move will be upward. Bids were closed last week on the Pennsylvania's list of 31,000 tons, which included 10,000 tons of No. 1 steel. This material will go to the Pittsburgh district at a price slightly under that paid last month.

Buffalo

A definite scrap shortage exists due to the comparatively recent heavy shipments to Butler, Weirton and Youngstown. With local mills in a buying mood, heavy supplies do not exist. One mill acquired about 2000 tons of No. 1 and No. 2 steel at $16 and $14.50 respectively. A sizable tonnage of cupola cast was taken by a local foundry at $15, and sales of this grade have been made at nearby points at better than $15. Low phos material has been sold at $20 and even better at nearby points, although most of the grade sold here is going for $19. Extensive buying is reported by Buffalo mills at Detroit at prices better than have been offered locally.

New York

The undertone here is somewhat confused, as some dealers claim that a flat rate of $11 for No. 1 is representative, whereas another broker continues to buy at a higher figure. No. 1 and No. 2 are currently quotable at $11 to $11.75 and $9.50 to $10 respectively. Steel and foundry grades are off from 50c. to $1 a ton, while blast furnace scrap also is easier. For the past three weeks mill demand has been too limited to enable the market here to continue at unchanged prices. Resumption of purchases in small quantity by eastern Pennsylvania consumers is under way, however. Export business is quiet. Italy has bought a little during the past fortnight, but Japan as a buyer has lagged. Japan continues to take shipments on old contracts which should have been cleared up by the close of last month.

Cincinnati

Miscellaneous sales totaling about 15,000 tons the past week reflected mill pressure on prices, and dealers have been forced to shade prices from recent levels. Bids, on the other hand, are held strong as dealers move to broaden their positions in anticipation of first quarter possibilities. Consumers' stocks are diminishing at a fast rate and the immediate future appears promising.

St. Louis

Buyers in this area have taken nearly all of the 100 carloads of scrap iron offered by the Missouri Pacific and 4000 tons offered by the St. Louis-San Francisco railroads last week. Thus the short interest of local dealers has been eased to some extent. There was no new buying by the mills, but dealers report prospects are bright for such buying. Prices are unchanged.

Detroit

As the end of navigation season approaches and rail tariffs must be added to Detroit prices in place of water rates to other points, the local market has definitely softened. It is expected, however, that boat shipments will continue until the middle of December. There has been little local mill buying in the last few weeks although shipments continue heavy on old contracts. Large lists to be issued by principal automobile plants next week should definitely set the market, but bids by brokers to yard dealers are definitely off.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$17.00 to $17.50
No. 2 hvy. mltng. steel.	15.00 to 15.50
No. 2 RR. wrought	17.00 to 17.50
Scrap rails	17.50 to 18.00
Rails, 3 ft. and under	20.00 to 20.50
Comp. sheet steel	17.00 to 17.50
Hand. bundled sheets	16.00 to 16.50
Hvy. steel axle turn.	15.50 to 16.00
Machine shop turn.	11.50 to 12.00
Short shov. turn.	12.00 to 12.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	12.50 to 13.00
Cast iron carwheels	17.00 to 17.50
Hvy. breakable cast	14.50 to 15.00
No. 1 cast	16.00 to 16.50
RR. knuckles & cplrs.	20.50 to 21.00
Rail coil & leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet crops.	21.50 to 22.00
Low phos. sh. bar	21.00 to 21.50
Low phos. punchings	20.50 to 21.00
Low phos. plate scrap.	20.50 to 21.00
Steel car axles	19.50 to 20.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$15.50 to $16.00
No. 2 hvy. mltng. steel.	14.50 to 15.00
Comp. sheet steel	15.00 to 15.50
Light bund. stampings	11.50 to 12.00
Drop forge flashings	14.50 to 15.00
Machine shop turn.	10.50 to 11.00
Short shov. turn.	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
Steel axle turnings	12.00 to 12.50
Low phos. billet crops	19.00 to 19.50
Cast iron borings	11.00 to 11.50
Mixed bor. & turn.	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
No. 1 cast	16.75 to 17.25
Railroad grate bars	9.00 to 9.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	16.50 to 17.00
Railroad malleable	17.75 to 18.00
Cast iron carwheels	.... 15.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$14.50 to $15.00
No. 2 hvy. mltng steel.	13.50 to 14.00
Hydraulic bund., new	15.00 to 15.50
Hydraulic bund., old	12.50 to 13.00
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Hvy. breakable cast	.... 15.50
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	.... 12.50
Railroad malleable	.... 16.50
Machine shop turn.	9.50 to 10.00
No. 1 blast furnace	8.50 to 9.00
Cast borings	8.00 to 8.50
Heavy axle turnings	12.50 to 13.00
No. 1 low phos. hvy.	20.00 to 20.50
Couplers & knuckles	19.50 to 20.00
Rolled steel wheels	19.50 to 20.00
Steel axles	20.50 to 21.00
Shafting	20.50 to 21.00
No. 1 RR. wrought	16.00 to 16.50
Spec. iron & steel pipe	13.50 to 14.00
Bundled sheets	14.00 to 14.50
No. 1 forge fire	14.50 to 15.00
Cast borings (chem.)	10.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$16.25 to $16.75
Auto. hvy. mltng. steel.	14.00 to 14.50
Shoveling steel	16.25 to 16.75
Hydraul. comp. sheets.	15.00 to 15.50
Drop forge flashings	13.50 to 14.00
No. 1 busheling	14.75 to 15.25
Rolled carwheels	18.00 to 18.50
Railroad tires, cut	18.00 to 18.50
Railroad leaf springs	17.50 to 18.00
Axle turnings	15.00 to 15.50
Steel coup. & knuckles	18.00 to 18.50
Coil springs	19.00 to 19.50
Axle turn. (elec.)	16.00 to 16.50
Low phos. punchings	18.75 to 19.25
Low phos. plates, 12 in. and under	18.75 to 19.25
Cast iron borings	9.50 to 10.00
Short shov. turnings	10.50 to 11.00
Machine shop turn.	8.50 to 9.00
Rerolling rails	17.00 to 17.50
Steel rails under 3 ft.	17.00 to 17.50
Steel rails under 2 ft.	18.50 to 19.00
Angle bars, steel	18.00 to 18.50
Cast iron carwheels	16.50 to 17.00
Railroad malleable	18.00 to 18.50
Agric. malleable	.... 15.00
	Per Net Ton
Iron car axles	$18.50 to $19.00
Steel car axles	17.75 to 18.25
No. 1 RR. wrought	14.25 to 14.75
No. 2 RR. wrought	$14.50 to $15.00
No. 2 busheling, old	6.00 to 6.50
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast	14.00 to 14.50
Clean auto. cast	13.00 to 13.50
No. 1 railroad cast	13.50 to 14.00
No. 1 agric. cast	11.00 to 11.50
Stove plate	8.75 to 9.25
Grate bars	9.50 to 10.00
Brake shoes	10.50 to 11.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel.	$16.00 to $16.50
No. 2 hvy. mltng. steel.	14.50 to 15.00
Scrap rails	16.00 to 16.50
New hy. b'ndled sheets	14.50 to 15.00
Old hydraul. bundles	13.00 to 13.50
Drop forge flashings	14.50 to 15.00
No. 1 busheling	14.25 to 15.00
Hvy. axle turnings	10.50 to 11.00
Machine shop turn.	9.50 to 10.00
Knuckles & couplers	18.50 to 19.00
Coil & leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phos. billet crops.	18.50 to 19.00
Short shov. turnings	10.00 to 10.50
Mixed bor. & turn.	10.00 to 10.50
Cast iron borings	10.00 to 10.50
No. 2 busheling	11.00 to 11.50
Steel car axles	17.00 to 17.50
Iron axles	12.00 to 12.50
No. 1 machinery cast	15.00 to 15.50
No. 1 cupola cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Steel rails under 3 ft.	17.50 to 18.00
Cast iron carwheels	15.50 to 16.00
Railroad malleable	17.00 to 18.00
Chemical borings	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$12.50 to $13.00
Scrap steel rails	12.50 to 13.00
Short shov. turnings	.... 8.00
Stove plate	.... 8.50
Steel axles	.... 15.00
Iron axles	.... 15.00
No. 1 RR. wrought	.... 10.00
Rails for rolling	.... 14.00
No. 1 cast	.... 13.50
Tramcar wheels	.... 13.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. steel	$15.00 to $15.50
No. 1 hvy. melting	14.50 to 15.00
No. 2 hvy. melting	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
Misc. stand.-sec. rails	15.25 to 15.75
Railroad springs	16.50 to 17.00
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought	14.50 to 15.00
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.	5.50 to 6.00
Rails for rolling	15.75 to 16.25
Machine shop turn.	4.00 to 4.50
Heavy turnings	10.50 to 11.00
Steel car axles	17.00 to 17.50
Iron car axles	18.00 to 18.50
No. 1 RR. wrought	12.50 to 13.00
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	15.50 to 16.00
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	12.50 to 13.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	12.50 to 13.00
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00
Grate bars	9.00 to 9.50
Brake shoes	11.25 to 11.75

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	11.50 to 12.00
Scrap rails for mltng.	14.00 to 14.50
Loose sheet clippings	8.50 to 9.00
Bundled sheets	10.50 to 11.00
Cast iron borings	6.50 to 7.00
Machine shop turn.	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	15.00 to 15.50
No. 1 locomotive tires	12.50 to 13.00
Short rails	17.00 to 17.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.50 to 14.00
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Agricult. malleable	13.00 to 13.50
Railroad malleable	15.00 to 15.50

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$13.00 to $13.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Borings and turnings	9.00 to 9.50
Long turnings	$8.50 to $9.00
Short shov. turnings	10.00 to 10.50
No. 1 machinery cast	14.50 to 15.00
Automotive cast	14.50 to 15.00
Hydraul. comp. sheets.	13.75 to 14.25
Stove plate	8.50 to 9.00
New factory bushel	12.50 to 13.00
Old No. 2 busheling	8.25 to 8.75
Sheet clippings	10.00 to 10.50
Flashings	12.25 to 12.75
Low phos. plate scrap.	13.50 to 14.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel.	$10.75	$10.50
No. 2 hvy. mltng. steel.	9.75	9.25
Mixed dealers steel	7.75	7.75
Scrap pipe	6.75	6.50
Steel turnings	4.25	4.25
Cast iron turnings	4.75	4.50
Machinery cast	11.75	11.00
Dealers cast	10.75	10.00
Stove plate	7.25	6.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel.	$16.75 to $17.25
Hydraulic bundles	16.00 to 16.50
Machine shop turn.	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$11.00 to $11.75
No. 2 hvy. mltng steel.	9.50 to 10.00
Hvy. breakable cast	10.50 to 11.00
No. 1 machinery cast.	11.50 to 12.00
No. 2 cast	10.50 to 11.00
Stove plate	.... 9.00
Steel car axles	16.00 to 17.00
Shafting	15.00 to 16.00
No. 1 RR. wrought	12.00 to 12.50
No. 1 wrought long	11.00 to 11.50
Spec. iron & steel pipe	10.50 to 11.00
Forge fire	8.00 to 8.50
Rails for rolling	11.50 to 12.00
Short shov. turnings	5.00 to 5.50
Machine shop turn.	5.00 to 5.50
Cast borings	5.00 to 5.50
No. 1 blast furnace	4.50 to 5.00
Cast borings (chem.)	10.00 to 11.00
Unprepar. yard scrap.	6.00 to 6.50

Per gross ton, delivered local foundries:

No. 1 machn. cast	$14.00 to $14.50
No. 1 hvy. cast cupola.	11.50 to 12.00
No. 2 cast	10.50 to 11.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel.	$10.75 to $11.00
Scrap rails	11.00 to 11.25
No. 2 steel	8.75 to 9.00
Breakable cast	10.00 to 10.25
Machine shop turn.	.... 5.50
Bund. skeleton long	.... 9.50
Shafting	15.00 to 15.25
Cast bor. chemical	6.00 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	$12.00 to $13.50
No. 1 machine cast	12.00 to 13.50
Stove plate	9.50 to 10.00

EXPORT

Brokers' buying prices per gross ton:

New York, delivered alongside barges

No. 1 hvy. mltng. steel.	.... $11.00
No. 2 hvy. mltng. steel.	.... 10.00
No. 2 cast	.... 10.00
Stove plate	.... 9.00
Rails (scrap)	$10.75 to 11.00

Boston on cars at Army Base or Mystic Wharf

No. 1 heavy melting steel	$12.00
No. 2 heavy melting steel	11.00
Rails (scrap)	12.50
Stove plate	7.75
Machine shop turn.	6.00

New Orleans, on cars at Stuyvesant Dock

No. 1 hvy. mltng. steel.	$12.60 to $12.75
No. 2 hvy. mltng. steel.	11.60 to 11.75

Los Angeles, on cars or trucks at local piers

No. 1 hvy. mltng. steel.	$10.50 to $11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$32.00
Forging quality	39.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$32.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.80c.

Wire Rods

(No. 5 to 15/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$40.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	41.00
F.o.b. Worcester, Mass.	42.00
F.o.b. Birmingham	43.00
F.o.b. San Francisco	49.00
F.o.b. Galveston	46.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago or Gary	2.10c.
F.o.b. Duluth	2.20c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Buffalo	2.15c.
Del'd Philadelphia	2.36c.
Del'd New York	2.40c.
F.o.b. Birmingham	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars Pacific ports	2.60c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.90c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	1.95c.
F.o.b. Buffalo	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.10c.
Del'd Detroit	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.35c.
F.o.b. Cleveland, Chicago and Gary	2.40c.
F.o.b. Buffalo	2.45c.
Del'd Detroit	2.50c.
Del'd eastern Michigan	2.55.c

*In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago or Gary	1.95c.
Del'd Cleveland	2.095c.
F.o.b. Coatesville or Spar. Pt.	2.00c.
Del'd Philadelphia	2.09c.
Del'd New York	2.19c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.45c.
F.o.b. Chicago	3.50c.
F.o.b. Coatesville	3.55c.
F.o.b. cars dock Gulf ports	3.85c.
F.o.b. cars dock Pacific ports	4.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
Del'd Cleveland	2.095c.
F.o.b. Buffalo or Bethlehem	2.00c.
Del'd Philadelphia	2.115c.
Del'd New York	2.1625c.
F.o.b. Birmingham (standard)	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Buffalo	2.35c.
F.o.b. cars dock Gulf or Pacific Coast ports	2.70c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes	2.75c.
Tie plates, steel	2.00c.
Tie plates, Pacific Coast ports	2.10c.
Track bolts, to steam railroads	3.75c.
Track bolts, to jobbers, all sizes (per 100 counts) 70 per cent off list	

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.95c.
No. 10, f.o.b. Gary	2.05c.
No. 10, del'd Detroit	2.15c.
No. 10, del'd Philadelphia	2.26c.
No. 10, f.o.b. Birmingham	2.10c.
No. 10, f.o.b. cars dock Pacific ports	2.50c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.60c.
No. 24, f.o.b. Gary	2.70c.
No. 24, del'd Detroit	2.80c.
No. 24, del'd Philadelphia	2.91c.
No. 24, f.o.b. Birmingham	2.75c.
No. 24, f.o.b. cars dock Pacific ports	3.25c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.60c.
No. 10 gage, f.o.b. Gary	2.70c.
No 10 gage, f.o.b. Detroit	2.80c.
No. 10 gage, del'd Philadelphia	2.91c.
No. 10 gage, f.o.b. Birmingham	2.75c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.20c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.05c.
No. 20 gage, f.o.b. Gary	3.15c.
No. 20 gage, del'd Detroit	3.25c.
No. 20 gage, del'd Philadelphia	3.36c.
No. 20 gage, f.o.b. Birmingham	3.20c.
No. 20 f.o.b. cars dock Pacific ports	3.60c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.20c.
No. 24, f.o.b. Gary	3.30c.
No. 24, del'd Philadelphia	3.51c.
No. 24, f.o.b. Birmingham	3.35c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	4.95c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.00c.
Armature	3.35c.
Electrical	3.85c.
Special Motor	4.90c.
Special Dynamo	5.60c.
Transformer	6.10c.
Transformer Special	7.10c.
Transformer Extra Special	7.60c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras, plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.50c.
F.o.b. Gary	3.60c.
F.o.b. cars dock Pacific ports	4.20c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.05c.
No. 20, f.o.b. Gary	3.15c.
No. 20, f.o.b. Birmingham	3.65c.
No. 20, f.o.b. cars dock Pacific ports	3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock Pacific ports	3.35c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh.	1.95c.
All widths up to 24 in., Chicago	2.05c.
All widths up to 24 in., del'd Detroit	2.15c.
All widths up to 24 in., Birmingham	2.10c.
Cooperage stock, Pittsburgh	2.05c.
Cooperage stock, Chicago	2.15c.

Cold-Rolled Strips*

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.80c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

	Pittsburgh and Cleveland	Worcester
Carbon 0.25-0.50%	2.60c.	2.80c.
Carbon .51- .75	3.70c.	3.90c.
Carbon .76-1.00	5.45c.	5.65c.
Carbon Over 1.00	7.50c.	7.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.50c.
Spring wire	3.05c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.05
Smooth coated nails	2.05

	Base per 100 Lb.
Annealed fence wire	$2.80
Galvanized fence wire	3.15
Polished staples	2.75
Galvanized staples	3.00
Barbed wire, galvanized	2.55
Twisted barbless wire	2.55
Woven wire fence, base column	60
Single loop bale ties, base column	52

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	.57	37	⅛	+91½	+138
¼ to ⅜	.60	44½	¼ & ⅜	+1½	+21½
½	.64½	55	½	31½	15
¾	.67½	59	¾	36½	20½
1 to 3	.69½	61½	1 & 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	.62	53½	2	.37	22½
2½ to 3.65		56½	2½ to 3½	38	25
3½ to 6.67		58½	4 to 8	.40	28½
7 & 8.66		56½	9 to 12	.38	24½
9 & 10.65½		56			
11 & 12.64½		55			

Butt Weld, extra strong, plain ends

⅛	.55½	42½	⅛	+13	+45½
¼ to ⅜	.57½	46½	¼ & ⅜	+2½	+34½
½	.62½	54½	½	32½	17½
¾	.66½	58½	¾	37½	22½
1 to 3	.68	61	1 to 2	.43½	29

Lap Weld, extra strong, plain ends

2	.60	52½	2	.40	26
2½ to 3.64		56½	2½ to 4.45½		33
3½ to 6.67½		60	4½ to 6.45		33½
7 & 8	.66½	57	7 & 8	.46	33
9 & 10	.65½	56	9 to 12.41½		30
11 & 12	.64½	55			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	17.61	16.01
2½ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	$21.45	$19.50
3½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb.	or ft. to	39,999 lb.	or ft.	5 %
12,000 lb.	or ft. to	24,999 lb.	or ft.	12½%
6,000 lb.	or ft. to	11,999 lb.	or ft.	25 %
2,000 lb.	or ft. to	5,999 lb.	or ft.	35 %
Under 2,000 lb.	or ft.			50 %

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago.	$48.40
6-in. and larger, del'd New York	45.20
*6-in. and larger, Birmingham	40.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	40.50
F.o.b. dock, Seattle	51.50

Class "A" and gas pipe, $3 extra. 4-in. pipe is $3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39. Birmingham, and $47.40, delivered Chicago and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. x 6 in. and smaller	70 and 10
Larger than ½ in.	70 and 5
Lag bolts	70 and 5
Plow bolts, Nos. 1, 2, 3, and 7 heads	70 and 5
Hot-pressed nuts, blank or tapped, square	70 and 5
Hot-pressed nuts, blank or tapped, hexagon	70 and 5
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 5
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 10
Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 5
Stove bolts in bulk	32½
Tire bolts	50 and 5

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh or Cleveland	$3.05
F.o.b. Chicago or Birmingham	3.15

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $51 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.55c.
Delivered price at Detroit is	2.70c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.95
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.05c. base per lb. Delivered Detroit, 3.20c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

	Base per Lb.
High speed	57½c.
High carbon chrome	37c.
Oil hardening	21c.
Special	19c.
Extra	15¾c.
Regular	12½c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Based on Exchange rate as of Oct. 6

Ferromanganese, export	$45.58
Billets, open-hearth	29.74 to $31.01
Tin plate, per base box	4.74 to 4.84
Steel bars, open-hearth	39.87
Beams, open-hearth	38.61
Channels, open-hearth	39.87
Angles, open-hearth	38.61
Black sheets, No. 24 gage	51.66
Galvanized sheets, No. 24 gage	61.50

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports

Based on Exchange rate of Oct. 6

Billets, Thomas	$19.27
Wire rods, No. 5 B.W.G.	36.90
Steel bars, merchant	26.64
Sheet bars	19.68
Plate, ¼ in. and up	35.42
Plate, 3/16 in. and 5 mm.	34.85
Sheets, ⅛ in.	36.90
Beams, Thomas	25.58
Angles (Basic)	25.58
Hoops and strip base	32.79
Wire, plain, No. 8	44.03
Wire nails	47.15
Wire, barbed, 4 pt. No. 10 B.W.G.	71.74

IRON AND STEEL SCRAP

. . . Composite drops to $16.17 a gross ton.

o o o

. . . Principal markets retain strength although buying continues to lag.

CONSUMER buying is still conspicuously absent in all major districts. Nonetheless, prices are generally holding remarkably steady, undoubtedly on the strength of an expected return of widespread demand over the turn of the year. Mills are now assured of sustained operations throughout the next two or three months, and this factor, together with typical delays in deliveries during the winter months, is counted on by most brokers to add materially to the value of their present holdings. For the same reasons there is a general disinclination to sell important tonnages for delivery very far forward.

At Buffalo a temporary shortage is reported, and in eastern Pennsylvania the No. 1 price has been marked down in sympathy with recent direct purchases by Bethlehem. Reflecting this decrease the composite figure is off 16c. to $16.17 a gross ton. Weakness in the Cleveland area continues, Pittsburgh is uncertain but generally firm and New York is down fractionally in the absence of new export business.

Pittsburgh

Although the market undertone continues strong, no substantial consumer purchases of No. 1 steel have been made in the past week. Nevertheless, steel is not coming out very freely and while odd cars bring $17, $17.25 is also being paid. The quotable range for heavy melting steel, $17 to $17.50, is substantiated by an $18 figure recently paid for the railroad grade. The main feature of the local market is the exceptional strength of specialties, quotations of which are up 50c. to $1. Not only are local steel foundries working at capacity, but one company plans to open its old plant at Verona, Pa., on Jan. 1 and will consume approximately 1500 tons of specialties a month. A development becoming more pronounced is the disposition on the part of some scrap consumers to buy for forward delivery.

Chicago

Weak and strong elements about balance in this market, and it cannot be determined at this time which way prices will move. Lake navigation is coming to a close after the largest water movement of scrap in many years. This fact and the approach of winter weather should be factors tending to add strength to the market. In favor of present price levels are the steady figures being obtained by railroads and yard dealers for steel mill grades. There remains an insistent demand for most specialties, which are being taken by users as fast as they appear in the market. Railroad offerings are light this week.

Cleveland

With somewhat more liberal offerings, prices on heavy melting steel scrap have declined 25c. a ton. Other grades are unchanged. Blast furnace grades remain firm. Prices are down 25c. to 50c. a ton in the Youngstown district. New consumer demand is lacking and brokers do not look for much business during the remainder of the year. A great deal of scrap from the upper Lakes is reaching Lake Erie ports by water, shipments being rushed in order to get them cleaned up before the closing of navigation.

Philadelphia

No. 1 steel is marked down 50c. this week to $14.50 to $15 in sympathy with sales within or below this range at Bethlehem. No. 2 steel is now quoted at $13.50 to $14. Present prices are not bringing out much material, and, in some places, an actual shortage is reported. Most buyers and sellers profess to believe that the next market move will be upward. Bids were closed last week on the Pennsylvania's list of 31,000 tons, which included 10,000 tons of No. 1 steel. This material will go to the Pittsburgh district at a price slightly under that paid last month.

Buffalo

A definite scrap shortage exists due to the comparatively recent heavy shipments to Butler, Weirton and Youngstown. With local mills in a buying mood, heavy supplies do not exist. One mill acquired about 2000 tons of No. 1 and No. 2 steel at $16 and $14.50 respectively. A sizable tonnage of cupola cast was taken by a local foundry at $15, and sales of this grade have been made at nearby points at better than $15. Low phos material has been sold at $20 and even better at nearby points, although most of the grade sold here is going for $19. Extensive buying is reported by Buffalo mills at Detroit at prices better than have been offered locally.

New York

The undertone here is somewhat confused, as some dealers claim that a flat rate of $11 for No. 1 is representative, whereas another broker continues to buy at a higher figure. No. 1 and No. 2 are currently quotable at $11 to $11.75 and $9.50 to $10 respectively. Steel and foundry grades are off from 50c. to $1 a ton, while blast furnace scrap also is easier. For the past three weeks mill demand has been too limited to enable the market here to continue at unchanged prices. Resumption of purchases in small quantity by eastern Pennsylvania consumers is under way, however. Export business is quiet. Italy has bought a little during the past fortnight, but Japan as a buyer has lagged. Japan continues to take shipments on old contracts which should have been cleared up by the close of last month.

Cincinnati

Miscellaneous sales totaling about 15,000 tons the past week reflected mill pressure on prices, and dealers have been forced to shade prices from recent levels. Bids, on the other hand, are held strong as dealers move to broaden their positions in anticipation of first quarter possibilities. Consumers' stocks are diminishing at a fast rate and the immediate future appears promising.

St. Louis

Buyers in this area have taken nearly all of the 100 carloads of scrap iron offered by the Missouri Pacific and 4000 tons offered by the St. Louis-San Francisco railroads last week. Thus the short interest of local dealers has been eased to some extent. There was no new buying by the mills, but dealers report prospects are bright for such buying. Prices are unchanged.

Detroit

As the end of navigation season approaches and rail tariffs must be added to Detroit prices in place of water rates to other points, the local market has definitely softened. It is expected, however, that boat shipments will continue until the middle of December. There has been little local mill buying in the last few weeks although shipments continue heavy on old contracts. Large lists to be issued by principal automobile plants next week should definitely set the market, but bids by brokers to yard dealers are definitely off.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$17.00 to $17.50
No. 2 hvy. mltng. steel	15.00 to 15.50
No. 2 RR. wrought	17.00 to 17.50
Scrap rails	17.50 to 18.00
Rails, 3 ft. and under	20.00 to 20.50
Comp. sheet steel	17.00 to 17.50
Hand. bundled sheets	16.00 to 16.50
Hvy. steel axle turn.	15.50 to 16.00
Machine shop turn.	11.50 to 12.00
Short shov. turn.	12.00 to 12.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	12.50 to 13.00
Cast iron carwheels	17.00 to 17.50
Hvy. breakable cast	14.50 to 15.00
No. 1 cast	16.00 to 16.50
RR. knuckles & cplrs.	20.50 to 21.00
Rail coil & leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet crops	21.50 to 22.00
Low phos. sh. bar	21.00 to 21.50
Low phos. punchings	20.50 to 21.00
Low phos. plate scrap	20.50 to 21.00
Steel car axles	19.50 to 20.00

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$15.50 to $16.00
No. 2 hvy. mltng. steel	14.50 to 15.00
Comp. sheet steel	15.00 to 15.50
Light bund. stampings	11.50 to 12.00
Drop forge flashings	14.50 to 15.00
Machine shop turn.	10.50 to 11.00
Short shov. turn.	11.00 to 11.50
No. 1 busheling	14.50 to 15.00
Steel axle turnings	12.00 to 12.50
Low phos. billet crops	19.00 to 19.50
Cast iron borings	11.00 to 11.50
Mixed bor. & turn.	11.00 to 11.50
No. 2 busheling	11.00 to 11.50
No. 1 cast	16.75 to 17.25
Railroad grate bars	9.00 to 9.50
Stove plate	9.00 to 9.50
Rails under 3 ft.	19.00 to 19.50
Rails for rolling	16.50 to 17.00
Railroad malleable	17.75 to 18.00
Cast iron carwheels	.... 15.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$14.50 to $15.00
No. 2 hvy. mltng steel	13.50 to 14.00
Hydraulic bund., new	15.00 to 15.50
Hydraulic bund., old	12.50 to 13.00
Steel rails for rolling	17.00 to 17.50
Cast iron carwheels	16.50 to 17.00
Hvy. breakable cast	.... 15.50
No. 1 cast	16.50 to 17.00
Stove plate (steel wks.)	.... 12.50
Railroad malleable	.... 16.50
Machine shop turn.	9.50 to 10.00
No. 1 blast furnace	8.50 to 9.00
Cast borings	8.00 to 8.50
Heavy axle turnings	12.50 to 13.00
No. 1 low phos. hvy.	20.00 to 20.50
Couplers & knuckles	19.50 to 20.00
Rolled steel wheels	19.50 to 20.00
Steel axles	20.50 to 21.00
Shafting	20.50 to 21.00
No. 1 RR. wrought	16.00 to 16.50
Spec. iron & steel pipe	13.50 to 14.00
Bundled sheets	14.00 to 14.50
No. 1 forge fire	14.50 to 15.00
Cast borings (chem.)	10.50 to 13.00

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$16.25 to $16.75
Auto. hvy. mltng. steel	14.00 to 14.50
Shoveling steel	16.25 to 16.75
Hydraul. comp. sheets	15.00 to 15.50
Drop forge flashings	13.50 to 14.00
No. 1 busheling	14.75 to 15.25
Rolled carwheels	18.00 to 18.50
Railroad tires, cut	18.00 to 18.50
Railroad leaf springs	17.50 to 18.00
Axle turnings	15.00 to 15.50
Steel coup. & knuckles	18.00 to 18.50
Coil springs	19.00 to 19.50
Axle turn. (elec.)	16.00 to 16.50
Low phos. punchings	18.75 to 19.25
Low phos. plates, 12 in. and under	18.75 to 19.25
Cast iron borings	9.50 to 10.00
Short shov. turnings	10.50 to 11.00
Machine shop turn.	8.50 to 9.00
Rerolling rails	17.00 to 17.50
Steel rails under 3 ft.	17.00 to 17.50
Steel rails under 2 ft.	18.50 to 19.00
Angle bars, steel	18.00 to 18.50
Cast iron carwheels	16.50 to 17.00
Railroad malleable	18.00 to 18.50
Agric. malleable	.... 15.00
	Per Net Ton
Iron car axles	$18.50 to $19.00
Steel car axles	17.75 to 18.25
No. 1 RR. wrought	14.25 to 14.75
No. 2 RR. wrought	$14.50 to $15.00
No. 2 busheling, old	6.00 to 6.50
Locomotive tires	13.00 to 13.50
Pipes and flues	8.50 to 9.00
No. 1 machinery cast	14.00 to 14.50
Clean auto. cast	13.00 to 13.50
No. 1 railroad cast	13.50 to 14.00
No. 1 agric. cast	11.00 to 11.50
Stove plate	8.75 to 9.25
Grate bars	9.50 to 10.00
Brake shoes	10.50 to 11.00

BUFFALO

Per gross ton, f.o.b. consumers' plants:

No. 1 hvy. mltng. steel	$16.00 to $16.50
No. 2 hvy. mltng. steel	14.50 to 15.00
Scrap rails	16.00 to 16.50
New hy. b'ndled sheets	14.50 to 15.00
Old hydraul. bundles	13.00 to 13.50
Drop forge flashings	14.50 to 15.00
No. 1 busheling	14.25 to 15.00
Hvy. axle turnings	10.50 to 11.00
Machine shop turn.	9.50 to 10.00
Knuckles & couplers	18.50 to 19.00
Coil & leaf springs	18.50 to 19.00
Rolled steel wheels	18.50 to 19.00
Low phos. billet crops	18.50 to 19.00
Short shov. turnings	10.00 to 10.50
Mixed bor. & turn.	10.00 to 10.50
Cast iron borings	10.00 to 10.50
No. 2 busheling	11.00 to 11.50
Steel car axles	17.00 to 17.50
Iron axles	12.00 to 12.50
No. 1 machinery cast	15.00 to 15.50
No. 1 cupola cast	14.50 to 15.00
Stove plate	12.50 to 13.00
Steel rails under 3 ft.	17.50 to 18.00
Cast iron carwheels	15.50 to 16.00
Railroad malleable	17.00 to 18.00
Chemical borings	10.50 to 11.00

BIRMINGHAM

Per gross ton delivered to consumer:

Hvy. melting steel	$12.50 to $13.00
Scrap steel rails	12.50 to 13.00
Short shov. turnings	.... 8.00
Stove plate	.... 8.50
Steel axles	.... 15.00
Iron axles	.... 15.00
No. 1 RR. wrought	.... 10.00
Rails for rolling	.... 14.00
No. 1 cast	.... 13.50
Tramcar wheels	.... 13.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:

Selected hvy. steel	$15.00 to $15.50
No. 1 hvy. melting	14.50 to 15.00
No. 2 hvy. melting	13.00 to 13.50
No. 1 locomotive tires	13.50 to 14.00
Misc. stand.-sec. rails	15.25 to 15.75
Railroad springs	16.50 to 17.00
Bundled sheets	9.50 to 10.00
No. 2 RR. wrought	14.50 to 15.00
No. 1 busheling	8.50 to 9.00
Cast bor. & turn.	5.50 to 6.00
Rails for rolling	15.75 to 16.25
Machine shop turn.	4.00 to 4.50
Heavy turnings	10.50 to 11.00
Steel car axles	17.00 to 17.50
Iron car axles	18.00 to 18.50
No. 1 RR. wrought	12.50 to 13.00
Steel rails under 3 ft.	16.00 to 16.50
Steel angle bars	15.50 to 16.00
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	12.50 to 13.00
Railroad malleable	15.50 to 16.00
No. 1 railroad cast	12.50 to 13.00
Stove plate	7.50 to 8.00
Agricul. malleable	12.50 to 13.00
Grate bars	9.00 to 9.50
Brake shoes	11.25 to 11.75

CINCINNATI

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$14.00 to $14.50
No. 2 hvy. mltng. steel	11.50 to 12.00
Scrap rails for mltng.	14.00 to 14.50
Loose sheet clippings	8.50 to 9.00
Bundled sheets	10.50 to 11.00
Cast iron borings	6.50 to 7.00
Machine shop turn.	7.50 to 8.00
No. 1 busheling	11.00 to 11.50
No. 2 busheling	6.50 to 7.00
Rails for rolling	15.00 to 15.50
No. 1 locomotive tires	12.50 to 13.00
Short rails	17.00 to 17.50
Cast iron carwheels	13.50 to 14.00
No. 1 machinery cast	14.00 to 14.50
No. 1 railroad cast	13.50 to 14.00
Burnt cast	9.50 to 10.00
Stove plate	9.50 to 10.00
Agricult. malleable	13.00 to 13.50
Railroad malleable	15.00 to 15.50

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$13.00 to $13.50
No. 2 hvy. mltng. steel	12.00 to 12.50
Borings and turnings	9.00 to 9.50
Long turnings	$8.50 to $9.00
Short shov. turnings	10.00 to 10.50
No. 1 machinery cast	14.50 to 15.00
Automotive cast	14.50 to 15.00
Hydraul. comp. sheets	13.75 to 14.25
Stove plate	8.50 to 9.00
New factory bushel	12.50 to 13.00
Old No. 2 busheling	8.25 to 8.75
Sheet clippings	10.00 to 10.50
Flashings	12.25 to 12.75
Low phos. plate scrap	13.50 to 14.00

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
No. 1 hvy. mltng. steel	$10.75	$10.50
No. 2 hvy. mltng. steel	9.75	9.25
Mixed dealers steel	7.75	7.75
Scrap pipe	6.75	6.50
Steel turnings	4.25	4.25
Cast iron turnings	4.75	4.50
Machinery cast	11.75	11.00
Dealers cast	10.75	10.00
Stove plate	7.25	6.75

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$16.75 to $17.25
Hydraulic bundles	16.00 to 16.50
Machine shop turn.	12.00 to 12.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$11.00 to $11.75
No. 2 hvy. mltng steel	9.50 to 10.00
Hvy. breakable cast	10.50 to 11.00
No. 1 machinery cast	11.50 to 12.00
No. 2 cast	10.50 to 11.00
Stove plate	.... 9.00
Steel car axles	16.00 to 17.00
Shafting	15.00 to 16.00
No. 1 RR. wrought	12.00 to 12.50
No. 1 wrought long	11.00 to 11.50
Spec. iron & steel pipe	10.50 to 11.00
Forge fire	8.00 to 8.50
Rails for rolling	11.50 to 12.00
Short shov. turnings	5.00 to 5.50
Machine shop turn.	5.00 to 5.50
Cast borings	5.00 to 5.50
No. 1 blast furnace	4.50 to 5.00
Cast borings (chem.)	10.00 to 11.00
Unprepar. yard scrap	6.00 to 6.50

Per gross ton, delivered local foundries:

No. 1 machn. cast	$14.00 to $14.50
No. 1 hvy. cast cupola	11.50 to 12.00
No. 2 cast	10.50 to 11.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

BOSTON

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. steel	$10.75 to $11.00
Scrap rails	11.00 to 11.25
No. 2 steel	8.75 to 9.00
Breakable cast	10.00 to 10.25
Machine shop turn.	.... 5.50
Bund. skeleton long	.... 9.50
Shafting	15.00 to 15.25
Cast bor. chemical	6.00 to 7.00

Per gross ton delivered consumers' yards:

Textile cast	$12.00 to $13.50
No. 1 machine cast	12.00 to 13.50
Stove plate	9.50 to 10.00

EXPORT

Brokers' buying prices per gross ton:

New York, delivered alongside barges	
No. 1 hvy. mltng. steel	.... $11.00
No. 2 hvy. mltng. steel	.... 10.00
No. 2 cast	.... 10.00
Stove plate	.... 9.00
Rails (scrap)	$10.75 to 11.00
Boston on cars at Army Base or Mystic Wharf	
No. 1 heavy melting steel	$12.00
No. 2 heavy melting steel	11.00
Rails (scrap)	12.50
Stove plate	7.75
Machine shop turn.	6.00
New Orleans, on cars at Stuyvesant Dock	
No. 1 hvy. mltng. steel	$12.60 to $12.75
No. 2 hvy. mltng. steel	11.60 to 11.75
Los Angeles, on cars or trucks at local piers	
No. 1 hvy. mltng. steel	$10.50 to $11.00
Compressed bundles	8.50 to 9.00

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are $2 a ton higher, and delivered Detroit $3 higher.

	Per Gross Ton
Rerolling	$32.00
Forging quality	39.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open-hearth or Bessemer	$32.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.80c.

Wire Rods

(No. 5 to 15/32 in.)

	Per Gross Ton
F.o.b. Pittsburgh or Cleveland	$40.00
F.o.b. Chicago, Youngstown or Anderson, Ind.	41.00
F.o.b. Worcester, Mass.	42.00
F.o.b. Birmingham	43.00
F.o.b. San Francisco	49.00
F.o.b. Galveston	46.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh	2.05c.
F.o.b. Chicago or Gary	2.10c.
F.o.b. Duluth	2.20c.
Del'd Detroit	2.20c.
F.o.b. Cleveland	2.10c.
F.o.b. Buffalo	2.15c.
Del'd Philadelphia	2.36c.
Del'd New York	2.40c.
F.o.b. Birmingham	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars Pacific ports	2.60c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh	1.90c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill.	1.95c.
F.o.b. Buffalo	2.00c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	2.05c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	2.10c.
Del'd Detroit	2.20c.
F.o.b. cars dock Gulf ports	2.45c.
F.o.b. cars dock Pacific ports	2.45c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh	1.90c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham	1.95c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.30c.

Iron

F.o.b. Chicago	1.80c.
F.o.b. Pittsburgh (refined)	2.10c.
Delivered New York	2.05c.
Delivered Philadelphia	2.10c.

Cold Finished Bars and Shafting*

	Base per Lb.
F.o.b. Pittsburgh	2.35c.
F.o.b. Cleveland, Chicago and Gary	2.40c.
F.o.b. Buffalo	2.45c.
Del'd Detroit	2.50c.
Del'd eastern Michigan	2.55c

*In quantities of 10,000 to 19,999 lb.

Plates

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago or Gary	1.95c.
Del'd Cleveland	2.095c.
F.o.b. Coatesville or Spar. Pt.	2.00c.
Del'd Philadelphia	2.09c.
Del'd New York	2.19c.
F.o.b. Birmingham	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.
Wrought iron plates, f.o.b. Pittsburgh	3.20c.

Floor Plates

F.o.b. Pittsburgh	3.45c.
F.o.b. Chicago	3.50c.
F.o.b. Coatesville	3.55c.
F.o.b. cars dock Gulf ports	3.85c.
F.o.b. cars dock Pacific ports	4.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh	1.90c.
F.o.b. Chicago	1.95c.
Del'd Cleveland	2.095c.
F.o.b. Buffalo or Bethlehem	2.00c.
Del'd Philadelphia	2.115c.
Del'd New York	2.1625c.
F.o.b. Birmingham (standard)	2.05c.
F.o.b. cars dock Gulf ports	2.30c.
F.o.b. cars dock Pacific ports	2.45c.

Steel Sheet Piling

	Base per Lb.
F.o.b. Pittsburgh	2.25c.
F.o.b. Chicago or Buffalo	2.35c.
F.o.b. cars dock Gulf or Pacific Coast ports	2.70c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb per gross ton	$36.37½
Angle bars, per 100 lb.	2.55

F.o.b. Code Basing Points

Light rails (from billets) per gross ton	$35.00
Light rails (from rail steel) per gross ton	34.00

	Base per 100 Lb.
Spikes	2.75c.
Tie plates, steel	2.00c.
Tie plates, Pacific Coast ports	2.10c.
Track bolts, to steam railroads	3.75c.
Track bolts, to jobbers, all sizes (per 100 counts)	70 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

SHEETS, STRIP, TIN PLATE, TERNE PLATE

Sheets

Hot Rolled

	Base per Lb.
No. 10, f.o.b. Pittsburgh	1.95c.
No. 10, f.o.b. Gary	2.05c.
No. 10, del'd Detroit	2.15c.
No. 10, del'd Philadelphia	2.26c.
No. 10, f.o.b. Birmingham	2.10c.
No. 10, f.o.b. cars dock Pacific ports	2.50c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh	2.60c.
No. 24, f.o.b. Gary	2.70c.
No. 24, del'd Detroit	2.80c.
No. 24, del'd Philadelphia	2.91c.
No. 24, f.o.b. Birmingham	2.75c.
No. 24, f.o.b. cars dock Pacific ports	3.25c.
No. 24, wrought iron, Pittsburgh	4.30c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh	2.60c.
No. 10 gage, f.o.b. Gary	2.70c.
No 10 gage, f.o.b. Detroit	2.80c.
No. 10 gage, del'd Philadelphia	2.91c.
No. 10 gage, f.o.b. Birmingham	2.75c.
No. 10 gage, f.o.b. cars dock Pacific ports	3.20c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh	3.05c.
No. 20 gage, f.o.b. Gary	3.15c.
No. 20 gage, del'd Detroit	3.25c.
No. 20 gage, del'd Philadelphia	3.36c.
No. 20 gage, f.o.b. Birmingham	3.20c.
No. 20 f.o.b. cars dock Pacific ports	3.60c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh	3.20c.
No. 24, f.o.b. Gary	3.30c.
No. 24, del'd Philadelphia	3.51c.
No. 24, f.o.b. Birmingham	3.35c.
No. 24, f.o.b. cars dock Pacific ports	3.80c.
No. 24, wrought iron, Pittsburgh	4.95c.

Electrical Sheets

(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.00c.
Armature	3.35c.
Electrical	3.85c.
Special Motor	4.90c.
Special Dynamo	5.60c.
Transformer	6.10c.
Transformer Special	7.10c.
Transformer Extra Special	7.60c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras, plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh	3.50c.
F.o.b. Gary	3.60c.
F.o.b. cars dock Pacific ports	4.20c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh	3.05c.
No. 20, f.o.b. Gary	3.15c.
No. 20, f.o.b. Birmingham	3.65c.
No. 20, f.o.b. cars dock Pacific ports	3.65c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.75c.
No. 28, Gary	2.85c.
No. 28, cars dock Pacific ports	3.35c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. Pittsburgh district mill	$5.25
Standard cokes, f.o.b. Gary	5.35

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.00
15-lb. coating I.C.	12.00
20-lb. coating I.C.	13.00
25-lb. coating I.C.	14.00
30-lb. coating I.C.	15.25
40-lb. coating I.C.	17.50

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

	Base per Lb.
All widths up to 24 in., P'gh.	1.95c.
All widths up to 24 in., Chicago	2.05c.
All widths up to 24 in., del'd Detroit	2.15c.
All widths up to 24 in., Birmingham	2.10c.
Cooperage stock, Pittsburgh	2.05c.
Cooperage stock, Chicago	2.15c.

Cold-Rolled Strips*

	Base per Lb.
F.o.b. Pittsburgh	2.60c.
F.o.b. Cleveland	2.60c.
Del'd Chicago	2.895c.
F.o.b. Worcester	2.80c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

	Pittsburgh and Cleveland	Worcester
Carbon 0.25-0.50%	2.60c.	2.80c.
Carbon .51- .75	3.70c.	3.90c.
Carbon .76-1.00	5.45c.	5.65c.
Carbon Over 1.00	7.50c.	7.70c.

Fender Stock

No. 14, Pittsburgh or Cleveland	2.90c.
No. 14, Worcester	3.30c.
No. 20, Pittsburgh or Cleveland	3.30c.
No. 20, Worcester	3.70c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

	Per Lb.
Bright wire	2.50c.
Spring wire	3.05c.

Chicago prices on products sold to the manufacturing trade are $1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are $2 a ton above, Birmingham $3 above, and Pacific Coast prices $9 a ton above Pittsburgh or Cleveland.

To the Trade

	Base per Keg
Standard wire nails	$2.05
Smooth coated nails	2.05

	Base per 100 Lb.
Annealed fence wire	$2.80
Galvanized fence wire	3.15
Polished staples	2.75
Galvanized staples	3.00
Barbed wire, galvanized	2.55
Twisted barbless wire	2.55
Woven wire fence, base column	60
Single loop bale ties, base column	52

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is $2 above Pittsburgh); Duluth, Minn., mill prices are $2 a ton over Pittsburgh except for woven wire fence, which is $3 over Pittsburgh and Birmingham mill prices are $3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are $6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of $6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	.57	37	⅛	+91½	+138
¼ to ⅜	.60	44½	¼ & ⅜	+1½	+21½
½	.64½	55	½	.31½	15
¾	.67½	59	¾	.36½	20½
1 to 3	.69½	61½	1 & 1¼	.39½	25½
			1½	.43½	28
			2	.41½	26

Lap Weld

2	.62	53½	2	.37	22½
2½ to 3	.65	56½	2½ to 3½	38	25
3½ to 6	.67	58½	4 to 8	.40	28½
7 & 8	.66	56½	9 to 12	.38	24½
9 & 10	.65½	56			
11 & 12	.64½	55			

Butt Weld, extra strong, plain ends

⅛	.55½	42½	⅛	+13	+45½
¼ to ⅜	.57½	46½	¼ & ⅜	+2½	+34½
½	.62½	54½	½	.32½	17½
¾	.66½	58½	¾	.37½	22½
1 to 3	.68	61	1 to 2	.43½	29

Lap Weld, extra strong, plain ends

2	.60	52½	2	.40	26
2½ to 3	.64	56½	2½ to 4.45	½	33
3½ to 6	.67½	60	4½ to 6.45		33½
7 & 8	.66½	57	7 & 8	.46	33
9 & 10	.65½	56	9 to 12	.41½	30
11 & 12	.64½	55			

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

		Cold Drawn	Hot Rolled
1 in. o.d.	13 B.W.G.	$ 8.60	$ 7.82
1¼ in. o.d.	13 B.W.G.	10.19	9.26
1½ in. o.d.	13 B.W.G.	11.26	10.23
1¾ in. o.d.	13 B.W.G.	12.81	11.64
2 in. o.d.	13 B.W.G.	14.35	13.04
2¼ in. o.d.	13 B.W.G.	16.00	14.54
2½ in. o.d.	12 B.W.G.	17.61	16.01
2¾ in. o.d.	12 B.W.G.	19.29	17.54
2¾ in. o.d.	12 B.W.G.	20.45	18.59
3 in. o.d.	12 B.W.G.	$21.45	$19.50
3½ in. o.d.	10 B.W.G.	41.08	37.35
3½ in. o.d.	11 B.W.G.	27.09	24.62
4 in. o.d.	10 B.W.G.	33.60	30.54
4½ in. o.d.	10 B.W.G.	41.08	37.35
5 in. o.d.	9 B.W.G.	51.56	46.87
6 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5	%
12,000 lb. or ft. to 24,999 lb. or ft.	12½	%
6,000 lb. or ft. to 11,999 lb. or ft.	25	%
2,000 lb. or ft. to 5,999 lb. or ft.	35	%
Under 2,000 lb. or ft.	50	%

CAST IRON WATER PIPE

	Per Net Ton
*6-in. and larger, del'd Chicago.	$48.40
6-in. and larger, del'd New York	45.20
*6-in. and larger, Birmingham	40.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	48.00
F.o.b. dock, Seattle	40.50
F.o.b. dock, Seattle	51.50

Class "A" and gas pipe, $3 extra.
4-in. pipe is $3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $39. Birmingham, and $47.40, delivered Chicago and 4-in. pipe, $42, Birmingham, and $50.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
Machine and carriage bolts:	
½ in. x 6 in. and smaller	70 and 10
Larger than ½ in.	70 and 5
Lag bolts	70 and 5
Plow bolts, Nos. 1, 2, 3, and 7 heads	70 and 5
Hot-pressed nuts, blank or tapped, square	70 and 5
Hot-pressed nuts, blank or tapped, hexagon	70 and 5
C.p.c. and t. square or hex. nuts, blank or tapped	70 and 5
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 10
Stove bolts in packages, nuts attached	75
Stove bolts in packages, with nuts separate	75 and 5
Stove bolts in bulk	82½
Tire bolts	50 and 5

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$3.05
F.o.b. Chicago or Birmingham	3.15

Small Rivets

(7/16-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70 and 5
F.o.b. Cleveland	70 and 5
F.o.b. Chicago and Birm'g'm.	70 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75
Milled headless set screws, cut thread ¾ in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.
Base price, $51 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.55c.
Delivered price at Detroit, is	2.70c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (½% Nickel)	$0.25
2100 (2½% Nickel)	0.95
2300 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30) Molybdenum (1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Carbon Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars ½c. per lb. higher with separate extras. Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.05c. base per lb. Delivered Detroit, 3.20c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

	Per Lb.
Forging billets	19.55c.
Bars	23c.
Plates	26c.
Structural shapes	23c.
Sheets	33c.
Hot-rolled strip	20¾c.
Cold-rolled strip	27c.
Drawn wire	23c.

TOOL STEEL

	Base per Lb.
High speed	57½c.
High carbon chrome	37c.
Oil hardening	21c.
Special	19c.
Extra	15¾c.
Regular	12½c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

British and Continental

BRITISH

Per Gross Ton
f.o.b. United Kingdom Ports

Based on Exchange rate as of Oct. 6

Ferromanganese, export	$45.58
Billets, open-hearth	29.74 to $31.01
Tin plate, per base box	4.74 to 4.84
Steel bars, open-hearth	39.37
Beams, open-hearth	38.61
Channels, open-hearth	39.37
Angles, open-hearth	38.61
Black sheets, No. 24 gage	51.66
Galvanized sheets, No. 24 gage	61.50

CONTINENTAL

Per Metric Ton, f.o.b. Continental Ports

Based on Exchange rate of Oct. 6

Billets, Thomas	$19.27
Wire rods, No. 5 B.W.G.	36.90
Steel bars, merchant	26.64
Sheet bars	19.68
Plate, ¼ in. and up	35.42
Plate, 3/16 in. and 5 mm.	34.85
Sheets, ⅛ in.	36.90
Beams, Thomas	25.58
Angles (Basic)	25.58
Hoops and strip base	32.79
Wire, plain, No. 8	44.03
Wire nails	47.15
Wire, barbed, 4 pt. No. 10 B.W.G.	71.74

IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.25c.
Structural shapes	3.25c.
Soft steel bars and small shapes	3.15c.
Reinforcing steel bars	3.15c.
Cold-finished and screw stock:	
Rounds and hexagons	3.60c.
Squares and flats	3.60c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.30c.
Hoops	3.80c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.45c.
Galv. sheets (No. 24), 25 or more bundles	4.05c.
Hot-rolled sheets (No. 10)	3.05c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	$3.77
Spikes, large	3.25c.
	Per Cent Off List
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	$3.65
Wire, black, soft ann'l'd, base per 100 lb.	3.05c.
Wire, galv. soft, base per 100 lb.	3.40c.
Common wire nails, per keg	2.30c.
Cement coated nails, per keg.	2.30c.

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.30c.
Soft steel bars, rounds	3.20c.
Soft steel bars, squares and hexagons	3.35c.
Cold-fin. steel bars:	
Rounds and hexagons	3.75c.
Flats and squares	3.75c.
Hot-rolled strip	3.40c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	3.85c.
Track bolts (keg lots)	4.85c.
Rivets, structural (keg lots)	3.80c.
Rivets, boiler (keg lots)	3.90c.
	Per Cent Off List
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	60
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57½
Wrought washers	$4.50 off list
Black ann'l'd wire per 100 lb.	$3.95
Com. wire nails, 50 kegs or more	2.40c.†
Cement c't'd nails, 50 kegs or more	2.40c.†

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. All prices are f.o.b. consumers' plants wihtin the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 65 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

†Prices for city and suburbs only.

NEW YORK

	Base per Lb.
Plates, ¼ in. and heavier	3.50c.
Structural shapes	3.47c.
Soft steel bars, rounds	3.51c.
Iron bars, Swed. charcoal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.06c.
Flats and squares	4.06c.
Cold-rolled; strip, soft and quarter hard	3.36c.
Hoops	3.66c.
Bands	3.66c.
Hot-rolled sheets (No. 10)	3.15c. to 3.41c.
Hot-rolled ann'l'd sheets (No. 24*)	3.75c. to 4.10c.
Galvanized sheets (No. 24*)	4.10c. to 4.50c.
Long terne sheets (No. 24)	5.25c. to 5.35c.
Armco iron, galv. (No. 24†)	5.65c.
Toncan iron, galv. (No. 24†)	5.65c.
Galvannealed (No. 24†)	5.75c.
Armco iron, hot-rolled annealed (No. 24†)	5.10c.
Toncan iron, hot-rolled annealed (No. 24†)	5.10c.
Armco iron hot-rolled (No. 10†)	4.15c.
Toncan iron, hot-rolled (No. 10†)	4.15c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.65c.
Deep drawing	5.40c.
Stretcher leveled	5.40c.
SAE, 2300, hot-rolled	6.97c.
SAE, 3100, hot-rolled	5.37c.
SAE, 6100, hot-rolled, annealed	9.57c.
SAE, 2300, cold-rolled	8.03c.
SAE, 3100, cold-rolled, annealed	7.43c.
Floor plate ⅛ in. and heavier	5.30c.
Standard tool steel	11.25c.
Wire, black annealed (No. 9)	3.50c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x ½ in. and larger	3.85c.
Open-hearth spring steel	4.00c. to 10.00c.
Common wire nails, base per keg	$3.21
	Per Cent Off List
Machine bolts, square head and nut:	
All diameters	65 and 10
Carriage bolts, cut thread:	
All diameters	65 and 10

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.55c.
Bars, soft steel (rounds and flats)	3.45c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.60c.
Cold-fin. rounds, shafting, screw stock	4.00c.
Hot-rolled annealed sheets (No. 24)	4.30c.
Galv. sheets (No. 24)	4.90c.
Hot-rolled sheets (No. 10)	3.40c.
Black corrug. sheets (No. 24)	4.30c.
*Galv. corrug. sheets	4.90c.
Structural rivets	4.15c.
Boiler rivets	4.25c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller.	55
Machine and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities	65

*No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.10c.
*Structural shapes	3.10c.
*Soft steel bars, small shapes, iron bars (except bands)	3.25c.
‡Reinforc. steel bars, sq. twisted and deformed	3.01c.
Cold-finished steel bars	4.01c.
*Steel hoops	3.55c.
*Steel bands, No. 12 and 3/16 in. incl.	3.30c.
Spring steel	5.00c.
†Hot-rolled anneal. sheets (No. 24)	3.85c.
†Galvanized sheets (No. 24)	4.50c.
*Hot-rolled annealed sheets (No. 10)	3.20c.
Diam. pat. floor plates, ¼ in.	5.05c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

†For 25 bundles or over.

‡For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.41c.
Soft steel bars	3.10c.
‡Reinforc. steel bars	2.10c.
†Cold-finished steel bars	3.75c.
Flat-rolled steel under ¼ in.	3.46c.
Cold-finished strip	†3.00c.
Hot-rolled annealed sheets (No. 24)	3.91c.
Galvanized sheets (No. 24)	4.61c.
Hot-rolled sheets (No. 10)	3.21c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.46c.
*Black ann'l'd wire, per 100 lb.	$2.80
*No. 9 galv. wire, per 100 lb.	3.15
*Com. wire nails, base per keg	2.25

†Outside delivery 10c. less.

*For 5000 lb. or less.

‡Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.52c.
Floor plates	5.27c.
Bars, rounds, flats and angles.	3.42c.
Other shapes	3.57c.
Rail steel reinforc. bars	3.25c.
Hoops and bands, 3/16 in. and lighter	3.57c.
Cold-finished bars	3.97c.
Hot-rolled annealed sheets (No. 24) 25 bundles or more.	3.72c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.07c.
Hot-rolled sheets (No. 10)	3.32c.
Structural rivets	4.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	$2.88
Com. wire nails, base per keg:	
Any quantity less than carload.	3.04
Cement c't'd nails, base 100-lb keg	3.50
Chain. lin. per 100 lb.	8.35
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$20.37
4-in.	48.14
Lap-welded steel boiler tubes, 2-in.	19.38
4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.48c.
Struc. shapes	3.35c.
Soft steel bars	3.25c.
Reinforcing bars	2.60c.
Cold-fin. flats and sq.	3.80c.
Rounds and hex.	3.80c.
Cold-rolled strip steel	3.19c.
Hot-rolled annealed sheets (No. 24)	4.26c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.53c.
Galv. sheet (No. 24)	4.80c.
Bands	3.53c.
Hoops	3.53c.
Heavy top-rolled sheets	3.28c.
Com. wire nails, base per keg.	$2.85
Black wire, base per 100 lb. (2500-lb. lots or under)	4.00
(Over 2500 lb.)	3.90

BOSTON

	Base per Lb.
Channels, angles	3.65c.
Tees and zees, under 3"	3.90c.
H beams and shapes	3.64c.
Plates — Sheared, tank, and univ. mill, ¼ in. thick and heavier	3.66c.
Floor plates, diamond pattern	5.46c.
Bar and bar shapes (mild steel)	3.65c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.75c. to 4.75c.
Half rounds, half ovals, ovals and bevels	4.90c.
Tire steel	4.90c.
Cold-rolled strip steel	2.45c.
Cold-finished rounds, squares and hexagons	4.15c.
Cold-finished flats	4.10c.
Blue annealed sheets, No. 10 ga.	3.75c.
One pass cold-rolled sheets No. 24 ga.	4.30c.
Galvanized steel sheets, No. 24 ga.	4.30c.
Lead coated sheets, No. 24 ga.	5.95c.

Price delivered by truck in metropolitan Boston, subject to quantity differentials.

DETROIT

	Base per Lb.
Soft steel bars	3.29c.
Structural shapes	3.52c.
Plates	3.52c.
Floor plates	5.27c.
Hot-rolled annealed sheets (No. 24)*	4.14c.
Hot-rolled sheets (No. 10)**	3.24c.
Galvanized sheets (No. 24)	4.82c.
Bands	3.49c.
Hoops	3.49c.
†Cold-finished bars	3.84c.
Cold-rolled strip	3.18c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.44c.

Bolts and nuts, in cases, 70 and 10 per cent off list
Broken cases..65 and 10 per cent off

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

* Base less 0.25c., 3500 lb. and over. Add 0.50c. per hundred lb. for broken bundles.

** Base less 0.25c., 1500 to 3749 lbs.; less 0.50c., 3750 to 7499 lb.; less 0.75c., 7500 lb. and over.

Galvanized and hot-rolled annealed may not be combined to obtain quantity deductions.

Country territory to be equalized on the Chicago plan.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.41c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.31c.
Soft steel bars, squares and hexagons	3.46c.
Hot-rolled strip	3.51c.
Hot-rolled sheets (No. 10)	3.26c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Galvanized sheets (No. 20)	4.76c.
Cold-finished steel bars	3.76c.
Cold-rolled strip	3.33c.
Structural rivets (keg lots)	4.01c.
Boiler rivets, cone head (keg lots)	4.11c.
Track spikes (keg lots)	4.06c.
Track bolts (keg lots)	5.06c.
Black annealed wire	3.40c.
Com. wire nails	2.60c.
Cement coated nails	2.60c.

	Per Cent Off List
Machine bolts carriage bolts and lag screws	70 to 75
Hot-pressed nuts, sq. and hex. tapped or blank (keg lots)	70

Prices given above are delivered Milwaukee.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 9999 lb. On galvanized and No. 24 hot-rolled annealed sheets the prices given apply on orders of 400 to 1500 lb. On cold-finished bars the prices are for orders of 1000 lb. or more of a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.45c.
Structural shapes	3.55c.
Plates	3.55c.
Cold-finished bars	4.00c.
Bands and hoops	3.65c.
Hot-rolled annealed sheets, No. 24	4.30c.
Galvanized sheets, No. 24	4.90c.

On mild steel bars, shapes, plates and hoops and bands the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.20c.
Structural shapes	3.10c.
Reinforcing bars	....prices on application
Plates	3.10c.
Hot-rolled sheets, No. 10	3.20c.
Bands	3.30c.
Hoops	3.55c.
Special threading steel	3.20c.
Diamond pattern floor plates ¼ in. and heavier	5.10c.
Galvanized bars and small shapes	5.70c.
Galvanized bands	5.80c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	3.88c.

All prices are for 2000 lb. and more.

For second zone add 10c. per 100 lb. for trucking.

List size extras of Aug. 15, 1935, and cutting extras to be added.

For cold-rolled products, list size extras from Jan. 1, 1936, and cutting extras to be added.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.46c.
Iron bars	3.46c.
Reinforcing bars	3.46c.
Structural shapes	3.66c.
Plates	3.66c.
Hot-rolled sheets No. 10	3.46c.
Hot-rolled annealed sheets, No. 24*	3.41c.
Galvanized sheets No. 24*	3.96c.
Steel bands	3.71c.
Cold-finished bars	4.281c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	3.57c.
Shapes, bar size	3.57c.
Iron bars	3.57c.
Structural shapes	3.77c.
Plates	3.77c.
Hot-rolled sheets, No. 10	3.57c.
Hot-rolled annealed sheets, No. 24	4.37c.
Galvanized sheets, No. 24	5.07c.
Steel bands	3.82c.
Cold-drawn rounds	4.04c.
Cold-drawn flats, squares, hexagons	6.04c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.45c.
Reinforcing bars	3.50c.
Structural shapes	3.65c.
Plates	3.65c.
Hot-rolled sheets, No. 10	3.65c.
Hot-rolled annealed sheets, No. 24	4.35c.
Galvanized sheets, No. 24	4.95c.
Steel bands	4.05c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Boiler rivets	4.25c.
Common wire nails, base per keg	$2.45
Bolts and nuts, per cent off list	70

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tank and U. M.	3.60c.	3.80c.	3.65c.
Shapes, standard	3.60c.	3.80c.	3.65c.
Soft steel bars	3.60c.	3.80c.	3.90c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.45c.	2.45c.	2.45c.
Hot-rolled annealed sheets (No. 24)	4.30c.	4.35c.	4.60c.
Hot-rolled sheets (No. 10)	3.70c.	3.90c.	3.85c.
Galv. sheets (No. 24 and lighter)	5.00c.	4.60c.	5.00c.
Galv. sheets (No. 22 and heavier)	5.00c.	4.80c.	5.00c.
Cold finished steel			
Rounds	6.05c.	6.10c.	6.00c.
Squares and hexagons	7.30c.	7.35c.	6.35c.
Flats	7.80c.	7.85c.	7.35c.
Common wire nails—base per keg less carload	$2.90	$2.90	$2.90

All items subject to differentials for quantity.

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	$45.00
High-heat duty, New Jersey	50.00
High-heat duty, Ohio	40.00
Intermediate, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	40.00
Intermediate, New Jersey	43.00
Intermediate, Ohio	35.00
Ground fire clay, per ton	7.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago District	54.00
Birmingham	$48 to 50.00
Silica cement per net ton	8.00

Chrome Brick

	Per Net Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$45.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	45.00

Magnesite Brick

	Per Net Ton
Standard f.o.b. Baltimore and Chester, Pa.	$65.00
Chemically bonded, f.o.b. Baltimore	55.00

Grain Magnesite

	Per Net Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$21.50
F.o.b. Bethlehem, Birdsboro, and Swedeland, Pa., and Sparrows Point, Md.	20.50
Delivered Brooklyn	22.9289
Delivered Newark or Jersey City	21.9873
Delivered Philadelphia	21.3132
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.50
F.o.b. Jackson, Ohio	21.25
Delivered Cincinnati	19.82
F.o.b. Duluth	20.00
F.o.b. Provo, Utah	17.50
Delivered San Francisco, Los Angeles or Seattle	22.315
F.o.b. Birmingham*	15.88

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	$21.00
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	20.00
F.o.b. Buffalo	18.50
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	19.00
Delivered Cincinnati	18.82
Delivered Canton, Ohio	20.3482
Delivered Mansfield, Ohio	20.8832
F.o.b. Jackson, Ohio	20.75
F.o.b. Provo, Utah	17.00
F.o.b. Birmingham	14.50

Bessemer

F.o.b. Everett, Mass.	$22.50
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	21.50
Delivered Boston Switching District	23.00
Delivered Newark or Jersey City	22.9873
Delivered Philadelphia	22.3132
F.o.b. Buffalo and Erie, Pa., and Duluth	20.50
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	20.00
F.o.b. Birmingham	21.00
Delivered Cincinnati	21.0807
Delivered Canton, Ohio	21.3482
Delivered Mansfield, Ohio	21.8832

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.	$24.00

Gray Forge

Valley or Pittsburgh furnace	$19.00

Charcoal

Lake Superior furnace	$22.50
Delivered Chicago	25.7528

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$21.00
No. 2 fdy., sil. 1.75 to 2.75	20.50
Malleable	22.50

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)	$75.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	$22.75

For each additional 0.5% silicon up to 17%, 50c. a ton is added.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Bessemer Ferrosilicon

F.o.b. Jackson, Ohio, Furnace

Per Gross Ton

10.00 to 10.50%	$27.75
10.51 to 11.00%	28.25
11.00 to 11.50%	28.75
11.51 to 12.00%	29.25
12.01 to 12.50%	29.75
12.51 to 13.00%	30.25
13.01 to 13.50%	30.75
13.51 to 14.00%	31.25
14.01 to 14.50%	31.75
14.51 to 15.00%	32.25
15.01 to 15.50%	32.75
15.51 to 16.00%	33.25
16.01 to 16.50%	33.75
16.51 to 17.00%	34.25

Manganese 2 to 3%, $1 a ton additional. For each unit of manganese over 3%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carloads	$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V.	$2.70 to $2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	$2.50
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$137.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carlots, f.o.b. Anniston, Ala., per gross ton with $3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	$38.00
Ton lots or less, per ton	43.00
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are $5 a ton higher except on 75 per cent ferrosilicon on which premium is $10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65
Mesabi, non-Bessemer, 51.50%	4.50
High phosphorus, 51.50%	4.40

Foreign Ore

C.i.f. Philadelphia or Baltimore

Per Unit

Iron, low phos., copper free, 55 to 58% dry Algeria	13.00c.
Iron, low phos., Swedish, average, 68½% iron	Nominal
Iron, basic or foundry, Swedish, aver. 65% iron	10.00c.
Iron, basic or foundry, Russian, aver. 65% iron	Nominal
Man., Caucasian, washed 52%	27c.
Man., African, Indian, 44-48%	25c.
Man., African, Indian, 49-51%	27.00c.
Man., Brazilian, 46 to 48½%, nominal	25c.

Per Net Ton Unit

Tungsten, Chinese, wolframite, duty paid delivered nominal	$15.25 to $15.50
Tungsten, domestic, scheelite delivered, nominal	15.00

Per Gross Ton

Chrome, 45% Cr_2O_3, lump, c.i.f. Atlantic Seaboard (African)	$17.50
45 to 46% Cr_2O_3 (Turkish)	$16.50 to 17.00
48% Cr_2O_3 (African)	20.50
48% min. Cr_2O_3 (Turkish)	19.25
Chrome concentrate, 50% and over Cr_2O_3, c.i.f. Atlantic ports	22.00
52% Cr_2O_3 (Turkish)	21.75
48 to 49% Cr_2O_3 (Turkish)	19.25

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$18.00
Domestic, barge and rail	18.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	19.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	22.00
Domestic No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore No. 3 distillate	4.25c.
F.o.b. Bayonne or Baltimore, No. 4 industrial	3.75c.
Del'd Ch'go, No. 3 industrial	5.00c.
Del'd Ch'go, No. 5 industrial	3.77c.
Del'd Cleve'd, No. 3 distillate	6.00c.
Del'd Cleve'd No. 4 industrial	5.75c.
Del'd Cleve'd No. 5 industrial	5.00c.

COKE AND COAL

Coke

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$3.75 to $4.00
Foundry, f.o.b. Connellsville, Prompt	4.25 to 5.75
Foundry, by-product, Chicago ovens	9.00
Foundry, by-product, del'd New England	11.50
Foundry, by-product, del'd Newark or Jersey City	9.60 to 10.05
Foundry, by-product, Philadelphia	9.38
Foundry, by-product, delivered Cleveland	10.30
Foundry, by-product, delivered Cincinnati	9.50
Foundry, Birmingham	6.50
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, from Birmingham, f.o.b. cars docks, Pacific ports	14.75

Coal

Per Net Ton

Mine run steam coal, f.o.b. W. Pa. mines	$1.50 to $1.75
Mine run coking coal, f.o.b. W. Pa.	1.75 to 1.90
Gas coal, ¾-in. f.o.b. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. Pa. mines	1.80 to 2.00
Steam slack, f.o.b. W. Pa. mines	1.00 to 1.25
Gas slack, f.o.b. W. Pa. mines	1.20 to 1.45

THIS WEEK'S MACHINE TOOL ACTIVITIES

. . . Outlook continues good in most sections of country.

° ° °

. . . November business may be slightly below October's high lavel.

° ° °

. . . Deliveries still a problem to users and builders.

New York

ALTHOUGH in some offices inquiries and orders have slowed somewhat recently, few sellers are concerned, for prospects seem fairly bright for good business over the next year. Weekly, and even monthly, spells of good and bad business, in the opinion of some machine tool sellers here, are meaningless when an attempt is made to interpret them as indicative of the status of the business at a given time. Instead, periods of three and six months must be observed, they say. Backlogs are unchanged for the most part, but in a few cases they have been extended for some types of products.

Cleveland

MACHINE tool sales by some manufacturers have fallen off this month, and the volume of business in November is not expected to equal that of October. Manufacturers who sold more machines last month than in any previous month for a long time hardly expected the volume of business to be maintained during November. Business with local dealers is quiet. Many prospective purchasers in this territory state that they will place no new orders until after the first of the year. The only inquiry of any size is from the Firestone Tire & Rubber Co., Akron, which has issued a list of 8 or 10 machines, mostly for replacement in its tool room.

Detroit

AFTER going through one of the best years in all time, sellers of tool room equipment are facing a lack of orders as the year end approaches. However, the year's sales to date have been so satisfactory that there is really no complaint. The production machinery market seems to be featured by the increase in purchases by some of the larger automobile plants, which are already engaged in bolstering up the weak spots of the machinery lines in order to increase output. Undoubtedly this year, as last, many companies, however, will build up large banks of parts and sub-assemblies such as motors and rear axles during the winter low point in order to provide continuity of employment as well as to meet the sales production peak without the necessity of putting in additional equipment to take care of it. This trend is particularly noticeable in the Chrysler organization.

Pittsburgh

INQUIRIES in the past week were almost 50 per cent better than in the week before. Some dealers are actually "swamped" with requests for data on individual machines. In quite a few cases some customers are asking for information on fair-sized lists. Likewise orders have also shown an upward spurt. Dealers are optimistic that this month's business will be ahead of that booked in October. In many cases manufacturers are being forced by sheer necessity to place orders for equipment needed some time ago. They are being pushed for delivery on their own products and find some of their present machinery unable to maintain the tempo of current consumption. Meanwhile deliveries are getting further behind and now average about 60 days. Promises on special jobs run from eight to nine months. Bethlehem Steel Corp.'s announcement last week regarding a new continuous mill uncovered the news that Mesta Machine Co., Pittsburgh, will furnish the rolling mill equipment. Electrical equipment is reported to be divided between Westinghouse Electric & Mfg. Co. and General Electric Co. Other large projects are in the offing, and it is now certain that mill equipment manufacturers will be extremely busy for some time to come.

St. Louis

THE Wabash Railway has been authorized by Federal Judge Davis to spend $66,688 for new shop machines and relocation of one, as follows: One horizontal spindle rod milling machine with motor drive and with rod fixtures for side and main rods and to relocate and equip with new chucks and fixtures rod milling machine VD No. 124 and retire planers VD 128 and VD 147; one vertical turret lathe complete with chuck and motor drive; one driving box milling machine complete with fixture and motor drive.

Cincinnati

DELIVERIES are a more serious problem to local machine tool builders than securing business. Current demand is fairly active in all types of tools, except heavy machinery, but in this latter group interest is not wholly lacking. The first request of buyers, however, is for prompt shipment. Production schedules have been stepped up to an average of about 80 per cent of capacity, several plants operating full on day shifts and others adding substantial night forces. The character of ordering is unchanged. One and two units are the quantity limits, although some multiple tool orders are reported in the offing. Inquiry is brisk.

Chicago

BUSINESS continues to expand, but it remains on the order of a machine here and a machine there. The general view is taken that most purchasers now anticipate a good 1937 and, being fully aware of extended deliveries, are not waiting for 1937 budgets, but are placing business now in order to have new equipment on hand for the rush which they expect. Another factor is that of increased prices. There is considerable talk throughout the trade of higher price levels to come about the first of the year. The usual trend in this direction is an advance of about 10 per cent, but percentages are not being mentioned in current discussions. Tractor plants are planning on spending more money for machine tools. The Rock Island will buy a 42-in. engine lathe. Steel mills are rather steady customers of machine tool manufacturers as evidenced by the recent purchase of a large roll grinder and inquiry for several lathes. Frog and switch manufacturers have bought several miscellaneous items, and there are inquiries out from paper machinery plants. Radial drills, long an active item in the machine tool market, continue to move briskly.

The Economics of Industrial Power Transmission

(CONTINUED FROM PAGE 41)

many items falling under three general heads; fixed charges, operation charges, and maintenance charges.

Fixed Charges: Any investment in equipment is subject to what are known in accounting practice as fixed charges; interest, depreciation and taxes. Money invested in one plant or department of a business can only be compared with money invested elsewhere by means of these annual charges, since they are a basis for the determination of the cost of using the money. If $100,000 is invested in equipment having a life of 20 years in a locality where taxes are $2 per thousand, the fixed charges on the investment (interest being 6 per cent) amount to $11,200 per year. The same sum invested in 10-year machines with taxes at $1 per thousand will cost in fixed charges $16,100 per year. Thus, although the investment is the same in both cases, the cost of the invested capital differs largely.

In considering the fixed charges on the installed cost of power transmission equipment it must be remembered that the various items depreciate on different bases—motors, controls, wiring, shafting, hangers, bearings, pulleys, belts, etc. Consequently the depreciation charge is never a flat percentage of the installed cost, but a figure made up of the combined depreciation charges on each piece of equipment. However, in a large number of cases examined, it has been found that *all* the fixed charges average approximately 15 per cent; this figure therefore may be taken for general comparison purposes as approximately correct.

Operating Costs: These are made up of the actual cost of the power used, the fixed charges on the installation cost, and the maintenance charges. The cost of the power used includes the power actually delivered to the machines, the losses due to friction, slip, etc., and the power factor of operation. Power delivered to the machines is the output of the system; power made available to the system is input. Output divided by input gives a measure of the efficiency of the system. The cost of input in any system using electrical motors is composed of two factors; the watt-hours of energy used to turn the motors, plus the wattless current required to energize the windings of the motors and to compensate for electrical losses in the wiring, transformers and controls. A more complete explanation of "power factor" (or the ratio between the total current required and the current effectively used to turn the motors) will be given later. Here it is sufficient to state that the watt-hours metered is *not* the total cost of electricity, for wattless energy must be paid for somehow, and must be considered as part of the operating cost of the system.

For many reasons, which will be discussed later, the squirrel cage induction type of alternating motor is the most popular type in American industry. But this type of motor has certain faults of efficiency. In addition to the small, inevitable losses due to friction, heating, etc., there is an item of "slip" to be considered. At various loads the useful work output of such motors varies from around 50 per cent to 85 per cent of the energy value of the current input. Motor manufacturers give these percentages in tables as "average motor efficiencies."

The installed motor horsepower in a drive system, multiplied by the number of hours of operation per year gives an annual figure called "installed horsepower hours per year." Against this, set the *actual* figure for energy used in the system for a year, computed from the metered input of energy and the efficiency curves of the motors. The comparison thus made will provide a ratio known as "average motor load." This ratio is a measure of the work actually performed by the motors compared with the work they are capable of performing under ideal conditions—and has a direct bearing on the power factor of operation and hence the costs of production.

Maintenance Costs: These vary so greatly according to the equipment installed and the care given to that equipment, that it is impossible to say more than this: Maintenance costs in any plant will vary in direct proportion to the number of items in the system to be maintained. In a large number of plants examined the cost of maintaining individual drive motors, drives, wiring, etc., has averaged about $10 per machine driven per year. For a smaller number of group

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driven systems, the maintenance cost per machine driven (including all items of power transmission equipment) has varied from less than $2 to about $7.50. It is probably safe to say that, all things being equal, in any particular plant the cost of maintenance for a group drive system will probably run from one-half to two-thirds the cost for an individual drive system.

A Typical Work Sheet

For the purpose of making the preceding discussion concrete, a work sheet has been prepared and is given here, showing the calculations made to compare the costs of operating a department using 42 heavy duty buffing machines, first by unit (individual motor) drive, and then by modern group drive. A study of this work sheet will make the principles just enumerated clear. These principles cover the *first phase* of the economic study only. The fact that the work sheet in question shows a difference in annual cost in favor of group drive of at least $3,500 is *not* conclusive proof that group drive is better than unit drive for this particular problem. In the next article the related economic questions of production flow and materials handling will be discussed.

FINANCIAL NOTES

Truscon Steel Co. had third-quarter net profit before allowance for Federal tax on undistributed earnings of $312,041, compared with $386,414 earned in the preceding quarter and net loss of $53,027 for the September quarter last year. In nine months, net income was $632,257 as against net loss of $214,565 in the same period of 1935.

Granite City Steel Co. in the nine months ended Sept. 30 had net profit of $190,075 after depreciation, Federal income taxes, etc., equal to 49c. a share on 382,488 shares. This compares with net earnings of $415,198, or $1.62 a share, on 254,992 shares for the same period of 1935.

American Rolling Mill Co. reports earnings of $2,063,603 equaling 89.2c. a common share after provision for preferred dividends for the third quarter. In the second quarter of this year, earnings were $1,561,161, or 68c. a common share, while in the third quarter of 1935, $552,137, equal to 34.5c. a common share, was realized. Earnings for this quarter do not include provision for Federal taxes on undistributed profits. For the 12 months ending Sept. 30, 1936, consolidated net earnings after depreciation, interest and taxes, were $5,669,548, equal, after deduction of $118,215 for preferred dividends, to $2.62 a share of common stock on an average of 2,113,903 shares. Production in Armco's Middletown plant, which is operating practically on a capacity schedule, was affected in recent months due to interruptions incident to the enlargement of its continuous sheet rolling mills, according to Charles R. Hook, president. The new installation has progressed to such an extent, he said, that with decreasing interruption, production may be stepped up. The work is scheduled for completion before the end of January, 1937.

Otis Steel Co., Cleveland, earned $495,110 during the third quarter after deducting interest, depreciation, amortization and Federal taxes. This compares with $751,674 during the second quarter and with a loss of $27,367 during the third quarter last year. Stockholders of the Otis company at a special meeting, Nov. 5, approved the plan of recapitalization previously submitted. Under this plan the present 7 per cent prior preference stock will be exchanged for a new convertible first preferred stock and common stock on the basis of 1.28 shares of new preferred and one share of common stock for each share of old stock.

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Sheared Steel Plates
Billets, Blooms & Slabs
"Swede" Pig Iron
"A.W." Rolled Steel Floor Plate
"A.W." "70-90" Super Strength Steel

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CONSHOHOCKEN, PA.
BRANCHES:
Philadelphia, New York, Boston, Detroit, Los Angeles, San Francisco, Seattle, Houston
110 YEARS' IRON- AND STEEL-MAKING EXPERIENCE

PLANT EXPANSION AND EQUIPMENT BUYING

. . . L. A. Young Spring & Wire Co., Detroit, has let contract for a new plant at Trenton, N. J., to cost over $400,000 complete.

o o o

. . . Gulf Refining Co., Pittsburgh, plans an expenditure of $750,000 for new units and equipment at Toledo.

NORTH ATLANTIC

Flintkote Co., 50 West Fiftieth Street, New York, manufacturer of roofing products, automotive specialties, etc., has let general contract to Ferber Construction Co., Hackensack, N. J., for three-story and basement addition to branch plant at East Rutherford, N. J., 125 x 265 ft. Cost close to $500,000 with equipment. Company also has plans for new mill at Vernon, Los Angeles, to be operated by its subsidiary, Pioneer-Flintkote Co., 5500 South Alameda Street, Los Angeles, for which bids will be asked soon on general contract. Cost about $1,000,000 with machinery.

Celanese Corp. of America, Inc., 180 Madison Avenue, New York, manufacturer of cellulose rayon products, has acquired plants of American Printing Co., and American Linen Co., Fall River, Mass., and will modernize for new rayon mill. Part of plant of last noted company will be razed and multi-story chemical plant erected on site. Entire mill will give employment to about 4500 persons. Cost over $800,000 with equipment.

George V. Clark Co., Inc., 42-26 Thirteenth Street, Long Island City, New York, manufacturer of tin cans and containers, has leased adjoining building for expansion.

Board of Education, City Hall, Troy, N. Y., plans manual training department in new two-story school in Prospect Park district, 375 x 500 ft., for which bids will be asked on general contract in about 60 days. Cost $1,400,000, of which fund of $643,000 has been secured through Federal grant. F. J. Morgan, 30 Second Street, is architect.

Pan-American Airways System, 122 East Forty-second Street, New York, has leased about 10 acres at municipal airport, Baltimore, for new terminal, to be improved for company by Municipal Airport Bureau, Logan Field, Dundalk, Baltimore, including hangar with repair and reconditioning shop, seaplane ramp and facilities, oil and gas storage and distributing units, and other structures. Cost over $100,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 24 for motor-driven screw machine turret lathes (Schedule 9282), triple conductor cable (Schedule 9262), 16 smoke indicators and spare parts for boiler units (Schedule 9258), boiler safety valves and spare parts (Schedule 9260), electric cable and magnet wire (Schedule 9290) for Brooklyn Navy Yard.

Kenilworth Mfg. Co., 519 Eighth Avenue, New York, manufacturer of fireproof roofing products, etc., has acquired former plant of United Engineering Corp., Kenilworth, near Cranford, N. J., totaling over 100,000 sq. ft. floor space, and will occupy.

Signal Corps Procurement District, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Nov. 23 for eight 70-ft. and 25 20-ft. steel antenna poles for radio station, Alexandria, Va. (Circular 79) until Nov. 27, 15,000 plugs (Circular 77).

Cornish Wire Co., 30 Church Street, New York, manufacturer of wire products, hardware specialties, etc., has acquired former mill of Boyd Textile Corp., Williamstown, Mass., and will remodel for new plant for employment of about 100 persons.

Quartermaster, West Point, N. Y., asks bids until Nov. 23 for plow steel wire rope (Proposal 955-55).

Coca-Cola Co., Atlanta, Ga., has acquired about six acres fronting on Lincoln Highway, Kearny, N. J., for Eastern branch plant for metropolitan area. It will consist of several one and multi-story units for beverage production, mechanical-bottling, storage and distribution. Cost over $600,000 with equipment.

L. A. Young Spring & Wire Corp., 9200 Russell Avenue, Detroit, has let general contract to William C. Ehret, 209 Academy Street, Trenton, N. J., for one-story plant, 250 x 500 ft., with two two-story bays, on 10-acre tract recently acquired on East State Street Extension, Trenton. Cost over $400,000 with equipment.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Nov. 23 for solid copper wire (Circular 284); until Nov. 24, 18,500 ft. flexible galvanized steel wire (Circular 286); until Nov. 25, 105,000 diaphragms (Circular 288).

Horlbeck Metal Crafts, Inc., 100 Hague Street, Jersey City, N. J., manufacturer of metal goods, has purchased two-story factory, 50 x 100 ft., at 420 Kerrigan Avenue, Union City, N. J., and will remodel for new plant. Present works will be removed to new location and capacity increased.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 24 for one motor-driven engine lathe (Schedule 9283) for Philadelphia Navy Yard.

Hamilton Watch Co., Lancaster, Pa., has let general contract to Herman Wohlsen's Sons Co., Woolworth Building, for four-story and basement addition. Cost over $100,000 with equipment. Prack & Prack, Martin Building, Pittsburgh, are architects.

Commanding Officer, Ordnance Department, Frankford Arsenal Philadelphia, asks bids until Nov. 23 for snap, plug, taper and thread ring gages (Circular 228.)

NEW ENGLAND

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 24 for two engine lathes (Schedule 9285), two riveting hammers (Schedule 9286), four surface grinding machines (Schedule 9287), all motor driven, for Newport, R. I., Naval Station.

Anchor Mfg. Co., 164 Oliver Street, Boston, manufacturer of metal stampings, electric wiring devices, etc., has leased space in former textile mill of Amoskeag Mfg. Co., Manchester, N. H., for plant, removing present works to new location and increasing capacity.

Board of Selectman, Stamford, Conn., has awarded general contract to Fenovese & Rich, Inc., 270 Atlantic Street, for three-story and basement trade and vocational school at Schuyler Avenue and Smith Street. Cost about $140,000 with equipment. William J. Provoost, Stamford, is architect.

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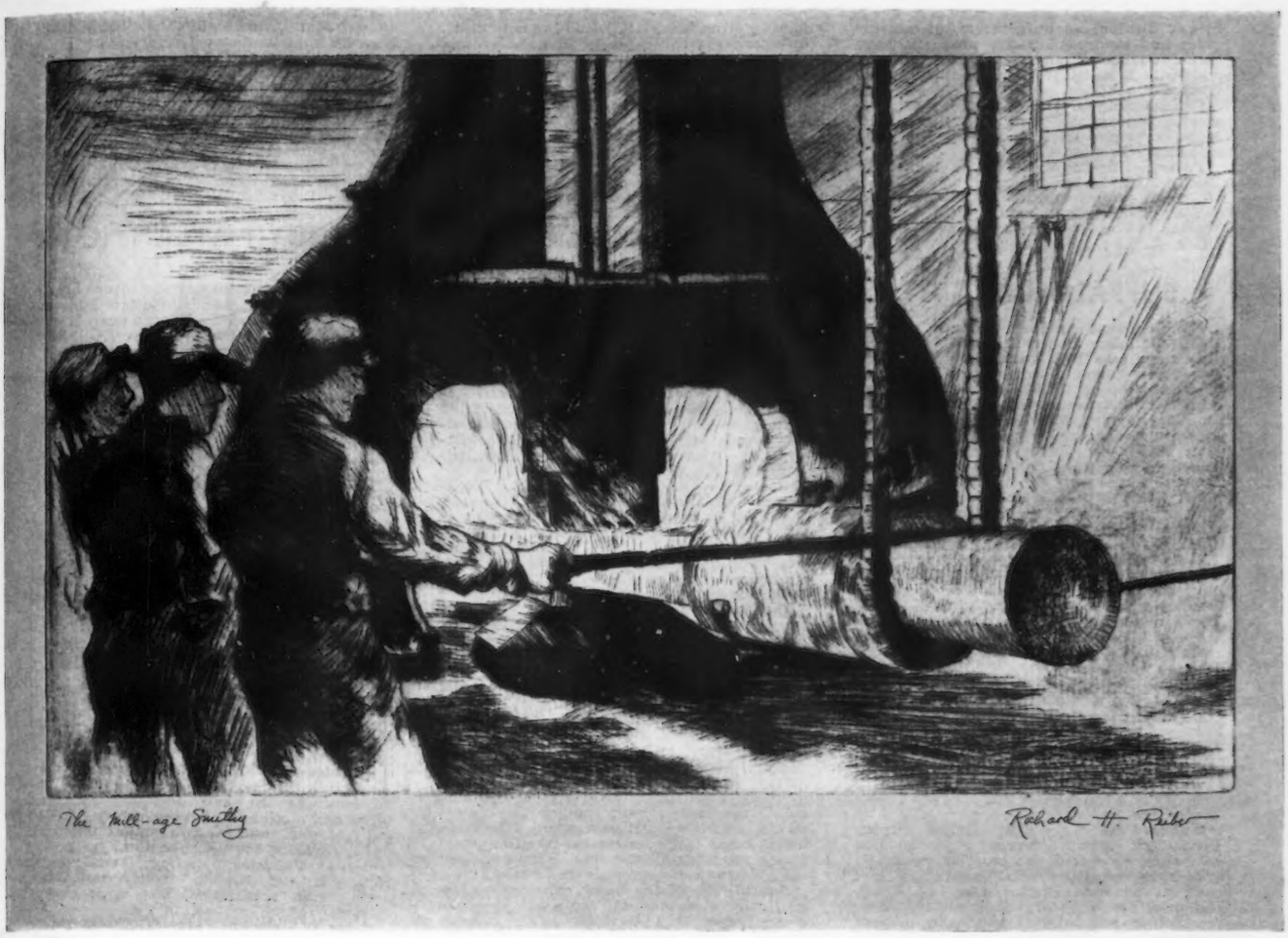

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CHICAGO CINCINNATI CLEVELAND DETROIT NEW YORK NORFOLK PHILADELPHIA WINSTON-SALEM

Street, Boston, manufacturers of marine glues and kindred adhesive products, have leased four-story factory at Medway, Mass., and will remodel for new plant, for increased production.

Commanding Officer, Ordnance Department, Springfield Armory, Springfield Mass., asks bids until Dec. 4 for two plain grinders (Circular 65).

Perennial Dye & Print Works, Inc., West Warwick, R. I., has plans for power house, 45 x 92 ft., at textile mill. Cost over $45,000 with equipment. William R. Walker & Son, 49 Weybosset Street, Providence, R. I., are architects.

BUFFALO DISTRICT

Buffalo Sewer Authority, Room 202, City Hall, Buffalo, Daniel H. McCarriagher. chairman, asks bids until Dec. 8 for new sewage treatment plant on Bird Island, including pumping station and grit chamber, with electric traveling cranes, motor-driven auxiliary pumps, vacuum pumps, air compressors, tanks, etc. (Division II, estimated cost $860,000); sludge pumping station, sedimentation tanks, sludge pumping and removal equipment, etc. (Division III, cost about $680,000); pumping machinery, including six motor-driven vertical shaft centrifugal pumping units, each with daily capacity of 120,000,000 gal., with suction piping, discharge valves and accessory equipment (Division IV, cost $250,000); electrical installation, including high-tension switchgear, power transformers, starting and control equipment, etc. (Division V, cost $84,000); and 28 motor-driven rectangular sluice gates and frames (Division VI, cost $60,000).

Hildick Distilleries, Inc., Lyons, N. Y., plans one-story addition to whiskey distillery. Cost close to $50,000 with equipment. Proposed to begin work early in 1937. J. E. Jennings is president.

WESTERN PA. DIST.

Hubbard & Co., 6301 Butler Street, Pittsburgh, manufacturers of pole line hardware, electrical construction materials and other metal products, have let general contract to Rust Engineering Co., Clark Building, for one-story addition, including remodeling and improvements in present forge shop, galvanizing shop and other departments. Cost over $65,000 with equipment.

Gulf Refining Co., Seventh and Grant Streets, Pittsburgh, has acquired tract adjoining oil refinery at Toledo for new units, to double present capacity in gasoline and other divisions. Expansion also will be carried out in storage and distributing department, including steel tanks and other equipment. Entire project will cost over $750,000. Company has let general contract to Hughes-Foulkrod Co., Koppers Building, Pittsburgh, for one and two-story and basement technical and laboratory building at Harmarville, Pa., 50 x 250 ft. Cost over $80,000 with equipment.

American Window Glass Co., Farmers Bank Building, Pittsburgh, has asked bids on general contract for one-story addition to sheet glass plant at Belle Vernon, Pa., 60 x 115 ft., for cutting, storage and distributing departments. Cost close to $50,000 with equipment.

WASHINGTON DIST.

Chemical Warfare Service, Edgewood Arsenal, Md., asks bids until Dec. 2 for 68,100 aluminum elbow nozzles and 35,350 aluminum angle tubes (Circular 53), copper diaphragm angle tubes and outlet valve guards (Circular 56).

Poole Foundry & Machine Co., Woodberry, Baltimore, manufacturer of gears, couplings, special machinery and parts, has let general contract to Carlstrand Engineering Co., 10 West Chase Street, for one-story addition. Cost close to $30,000 with equipment. Harry L. Katz, 3212 Gwynns Falls Parkway, is architect.

General Purchasing Officer, Panama Canal, Washington, asks bids until Nov. 23 for one ball-bearing bench grinder, galvanized sheet metal lockers, bare antenna wire, copper wire, steel foundry nails, five 200-kva. power type transformers, steel wool and other equipment (Schedule 3195); until Nov. 30, one motor-driven hand planer and jointer, one motor-driven woodworking surfacer, motor-driven tool grinder, flexible shaft grinder, gasoline engine-driven lawn mower, one vertical rotary miterer, pipe thread gages, steel machine bolts, manhole frames and covers, steel rivets, common steel carriage bolts, brass bolts, brass nuts, corrosion-resisting steel rivets, steel lag screws, one 25-ton platform scale and other equipment (Schedule 3196).

Submarine Mine Depot, Ordnance Department, Fort Monroe, Va., asks bids until Dec. 1 for 1000 to 2000 cable clamps, formed of iron or steel forgings, or malleable iron or steel castings and coated with hot-dip galvanizing or cadmium plating (Proposal 913-3).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 24 for four motor-driven engine lathes and spare parts (Schedule 9249), single-conductor cable and marker buoy cables (Schedule 9252), axes, hammers, hatchets, sledges and kindred tools (Schedule 9255), switch boxes (Schedule 9254), fittings and tubes (Schedule 9276); until Nov. 27, parts for airplanes (Schedule 900-207) for Eastern and Western Navy Yards; spare parts for airplanes (Schedule 900-192) for Sewall's Point Naval Station.

SOUTH ATLANTIC

Duke Power Co., Charlotte, N. C., has authorized expansion and improvements in Riverbend steam-operated electric generating plant on Catawba River, near Mount Holly, N. C., including new 75,000-hp. steam turbo-generator and auxiliary equipment, high-pressure boiler units, pumping machinery and accessories. Company will also make extensions in transmission lines in this and other districts, including distributing lines for rural electrification in several counties. Entire project will cost close to $3,000,000.

Cairo Tung Oil Co., Cairo, Va., recently organized, care of Cairo Chamber of Commerce, M. L. Mayes, secretary, has acquired site for one-story tung oil extraction plant. Cost over $50,000 with crushing, processing and other machinery.

United States Engineer Office, Charleston, S. C., asks bids until Nov. 23 for one electric generator, direct-current (Circular 31).

SOUTH CENTRAL

Brown Stove Works, Inc., Cleveland, Tenn., has approved plans for one-story addition, 125 x 200 ft., primarily for storage and distribution. Cost close to $45,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Nov. 24 for two deep-well pumping units and auxiliaries with capacity of 5000 gal. per min., and for two similar pumping units, capacity 500 gal. per min., for power house at Pickwick Landing, Tenn.; until Nov. 30, one 100-ton trolley unloading crane with accessories, for same power station.

Central Alabama Farmers' Co-Operative Co., Inc., Selma, Ala., B. L. Youngblood, president, recently organized with capital of $100,000, has approved plans for one-story plant on Range Road for manufacture of commercial fertilizers. Cost over $40,000 with mixing, conveying and other machinery. J. O. Risher is treasurer.

Shirley H. Cochran, Prichard, Ala., and associates have secured franchise for steam-operated electric power plant for local commercial service, including distributing lines. Cost about $100,000.

Dixie Foundry Co., Cleveland, Tenn., manufacturer of stoves and ranges, parts, etc., plans two one-story additions, for expansion in foundry and in assembling and mounting departments, respectively. Cost close to $100,000 with equipment.

United States Engineer Office, Vicksburg, Miss., asks bids until Nov. 23 for one single drum gasoline engine-driven hoist (Circular 104).

SOUTHWEST

Coleman Lamp & Stove Co., 253 North Mead Street, Wichita, Kan., manufacturer of stoves, lamps and other electric domestic products, has let general contract to John Denny, 1451 North Broadway, for two-story addition, 90 x 130 ft. Cost close to $60,000 with equipment.

Water Department, Oklahoma City, Okla., asks bids until Nov. 24 for electric-operated pumping machinery and auxiliaries, tanks, filtration machinery and other waterworks equipment. Frank Herrmann is engineer.

Continental Baking Co., 37 South Vandeventer Street, St. Louis, has asked bids on general contract for two-story addition to baking plant and improvements in present unit. Cost over $75,000 with equipment. Preston J. Bradshaw, Inc., 718 Locust Street, is architect.

Andrew County Consumers Co-Operative, Inc., Savannah, Mo., Wayne Sandade, secretary, recently organized, plans about 180 miles of transmission and distributing lines in parts of Andrew County for rural electrification, with power substation and service facilities. Fund of $195,000 is being arranged through Federal aid. M. B. Messler, Hannibal, Mo., is consulting engineer.

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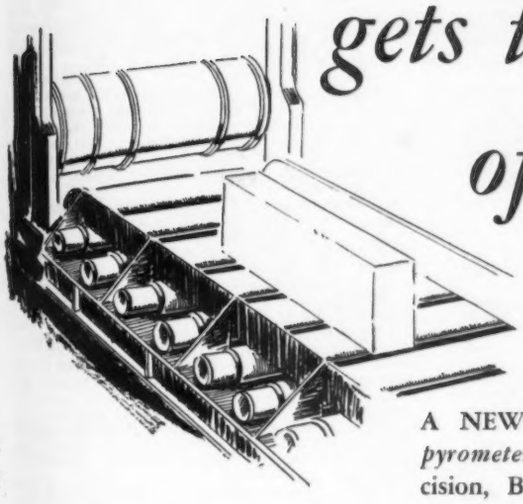

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Bristol's Electronic Instagraph, consisting of (from left to right) Potentiometer Amplifier, Thermo-Photronic Tube, and Strip Chart Recorder. Range 0 to 2250°F. Graduations at 2100°F are 3/16 inch wide for every 10°F. At 2250°F 1/4 inch wide. Approximate weight 80 lbs.

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Port Arthur, Tex., plans manual training department in new two-story junior high school, for which bids on general contract will be asked soon. Cost about $580,000. Financing has been arranged through Federal aid. Mark Lemmon, Tower Petroleum Building, Dallas, Tex., is architect.

Quartermaster, Kelly Field, Tex., asks bids until Nov. 28 for weatherproof wire, rubber-covered wire, switches, arming bolts, switch boxes, receptacles, wire fuses and other equipment (Proposal 464-17).

Cass-Liberty Gasoline Co., First National Bank Building, Dallas, Tex., has plans for new gasoline refinery near Rodessa, La., where property has been acquired, and will secure oil supply from Rodessa oil field, about 10 miles distant. It will include steel tank storage and distributing facilities. Cost over $260,000 with equipment. Petroleum Engineering Co., Philtower Building, Tulsa, Okla., is engineer.

OHIO AND INDIANA

Triplex Screw Co., 5317 Grant Avenue, Cleveland, manufacturer of cap screws, bolts, nuts, etc., has asked bids on general contract for one-story addition, 90 x 280 ft., with part of structure 60 x 90 ft. Cost over $65,000 with equipment.

Bender Body Co., West Sixty-second Street and Barberton Avenue, Cleveland, manufacturer of automobile bodies, trailers and parts, has acquired former Falcon-Knight plant of Willys-Overland Co. at Elyria, Ohio, consisting of one and multi-story buildings, totaling about 500,000 sq. ft. of floor space, on 18-acre tract. Structures will be remodeled for main plant of purchasing company, which will establish a new division for production of school buses, parts manufacture and assembling. Cost about $150,000 with equipment, exclusive of purchase price of property, approximating $100,000.

American Stove Co., Long Avenue, Lorain, Ohio, manufacturer of stoves, ranges and parts, has let general contract to J. C. F. Shafer Co., 1001 Huron Road, Cleveland, for two additions—one story, 165 x 200 ft., for assembling and mounting shop, and two stories, 60 x 120 ft., for machine shop. Cost close to $100,000 with machinery.

City Council, Berea, Ohio, plans extensions and improvements in municipal electric power plant, including additional equipment. Cost over $80,000. William C. Kammerer & Associates, 823 Prospect Avenue, Cleveland, are consulting engineers.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Nov. 23 for 500 ignition switch assemblies and 400 rheostats (Circular 286), four sets thread chasers (Circular 322); until Nov. 27, 115 oil pumps (Circular 301), adapters, clip assemblies, springs, lifter assemblies, motor assemblies, filter units and other equipment (Circular 327), one automatic engine synchronizer, four-engine operation (Circular 329).

Indianapolis Railways, Inc., 110 North Illinois Street, Indianapolis, asks bids on general contract until Dec. 1 for new motor bus shop, service and maintenance and storage buildings, including one-story machine shop, 165 x 365 ft.; one-story and basement service and transportation building, 70 x 225 ft.; and three-story and basement storage and distributing building, 156 x 300 ft. Cost about $750,000 with equipment. Herbert Foltz, Architects' and Builders' Buildings is architect; Bevington-Williams, Inc., Indiana Pythian Building, is consulting engineer.

Board of Township Trustees, Centerville, Ind., will take bids soon for addition to steam power plant used for school service, including installation of two horizontal tubular boilers with accessories, two automatic stokers, pumping machinery and auxiliary equipment. C. E. Werking & Son, 200 East Main Street, Richmond, Ind., are architects.

MICHIGAN DISTRICT

Bowen Products Corp., 2760 West Warren Street, Detroit, manufacturer of sheet metal stampings, oil and grease cups, and kindred products, has plans for one and two-story factory at Ecorse, Mich., 240 x 440 ft. Cost over $150,000 with equipment. Christian W. Brandt, Madison Theater Building, Detroit, is architect. Main offices of company are at Auburn, N. Y.

American Box Board Co., Grand Rapids, Mich., manufacturer of box board, liner boards, etc., plans three-story storage and distributing building, 75 x 350 ft. Cost about $125,000 with mechanical-handling and other equipment.

Superintendent of Lighthouses, 3760 East Jefferson Avenue, Detroit, asks bids until Dec. 7 for one 50-ft. steel pierhead tower and one helical bar lantern for Portage Lake Ship Canals Light Station.

Detroit, Toledo & Ironton Railroad Co., Dearborn, Detroit, has let general contract to W. H. Muller, 2211 Woodward Avenue, for new engine house and shop terminal at Flat Rock, Mich., including one-story machine shop, storage and distributing buildings, and other structures. Cost about $85,000 with equipment. Shreve, Anderson & Walker, Book Building, Detroit, are architects.

Kellogg Co., Battle Creek, Mich., manufacturer of cereal foods, has let general contract to F. J. Laird Construction Co., Battle Creek, for three multi-story additions to two local mills. Cost over $350,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Motor Wheel Corp., East Saginaw Street, Lansing, Mich., manufacturer of steel automobile wheels, heavy stampings, etc., has plans for one-story foundry buildings near McKinley Street, to be occupied under lease by Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich., for production for first noted company. Latter company will install equipment. Cost about $850,000.

MIDDLE WEST

United Screw & Bolt Corp., 2513 West Cullerton Street, Chicago, has let general contract to Dahl-Stedman Co., 11 South LaSalle Street, for one-story addition. Cost over $30,000 with equipment. Frank Huddleston, 140 South Dearborn Street, is architect.

Continental Scale Co., 5700 South Claremont Avenue, Chicago, has let general contract to August Federici, 6451 South Albany Avenue, for one-story addition, 50 x 141 ft. E. G. McClellan, 7541 Cottage Grove Avenue, is architect.

Chicago District Electric Generating Corp., 72 West Adams Street, Chicago, an interest of Commonwealth Edison Co., same address, plans expansion and improvements in Stateline steam-operated electric generating station at Hammond, Ind., including generating machinery and auxiliary equipment to increase capacity by 95,000 kw. Extensions will be made in transmission lines, switching and power substations. Entire project will cost about $5,000,000.

United States Engineer Office, Clock Tower Building, Rock Island, Ill., asks bids until Nov. 23 for one air compressor, complete with motor and auxiliary equipment (Circular 74).

Town Council, West Liberty, Iowa, plans extensions and improvements in municipal electric power plant, including new diesel engine-generator unit and accessories. Charles J. Mackey, town clerk, is in charge.

Northwest Airlines, Inc., 5226 West Sixty-third Street, Chicago, has leased new aircraft hangar, reconditioning and repair shop, 104 x 158 ft., to be erected by City Council, Billings, Mont., at local airport. Bids on general contract will be taken at once. Cost $90,000 with equipment. Financing has been arranged through Federal aid. Chandler Cohagen, Hedden Building, Billings, is architect; R. T. Hurdle is city engineer.

National Die Casting Co., 600 North Albany Street, Chicago, has let general contract to Erland H. Peterson, 6133 West Schuyler Street, for one-story addition. Cost close to $30,000 with equipment. R. Bernard Klekamp, 140 South Dearborn Street, is architect.

Hein-Werner Motor Parts Corp., Waukesha, Wis., manufacturer of manual and hydraulic jacks and other automotive specialties, has plans for enlarging machine shop floor space by 15,000 sq. ft., at cost of $35,000, including new equipment.

Delta Mfg. Co., 620 East Vienna Avenue, Milwaukee, manufacturer of machine tools for metal and woodworking for home machine shops, tool rooms, etc., is about to place contracts for shop extension, 50 x 230 ft., one story, to cost $35,000 with equipment. F. F. Drolshagen, 647 West Virginia Street, is architect.

PACIFIC COAST

Orange County Canners, Inc., Fullerton, Cal., has plans for one-story addition. Cost close to $40,000 with equipment. Norton Simon is general manager.

City Council, Porterville, Cal., plans one-story municipal repair shop. Cost $34,900 with equipment. Financing has been arranged through Federal aid. Bids will be asked soon on general contract. W. D. Coates, Fresno, Cal., is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Nov. 24 for following motor-driven machines: One metal-cutting band saw (Schedule 9238), one watchmakers' lathe and spare parts (Schedule 9256) for San Diego Naval Station; one bench lathe and spare parts (Schedule 9236), three radial drills and spare parts (Schedule 9243) for San Pedro Naval Station; three sensitive drills and spare parts (Schedule 9244), two power hacksaws and spare parts (Schedule 9234) for San Pedro and Puget Sound

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Pumps.—Worthington Pump & Machinery Corp. Bulletins covering line of centrifugal pumps and air compressors. Fully illustrated and explained. *Bulletin 11-45.*

Pumps.—Ingersoll-Rand Co. Bulletin covering line of coupled pumps, showing many views of pump installations, as well as construction details. *Bulletin 11-46.*

Pipe Threading & Cutting Machines. — The Curtis & Curtis Company. New catalog illustrates and describes the operation and construction of the line of Curtis revolving-head pipe threading and cutting machines. Contains data on range, size, capacity, dimensions of machines, weight, power required, prices, etc. *Bulletin 11-47.*

Micarta in Steel Mills. — A new leaflet has recently been issued by the Westinghouse Electric & Mfg. Co. illustrating applications of Micarta bearings, rings and standard miscellaneous shapes. Also, a booklet entitled "Where Can You Use Micarta" includes a description of Micarta, its mechanical and electrical properties and the standard forms available. *Bulletin 11-48.*

Thawing Frozen Water Pipes. —Hobart Brothers Co. Book covering actual cases of pipe thawing, time required, cost, length of pipe to be opened up, and size and kind of pipe. Contains complete drawings and diagrams explaining methods used. *Bulletin 11-49.*

Magnetic Separators. — Stearns Magnetic Mfg. Co. Booklet describing and illustrating line of high duty magnetic separators. *Bulletin 11-50.*

Electric Furnaces. — Ajax Electrothermic Corp. Bulletin describing and illustrating several oscillator or spark-gap type converters and furnaces. *Bulletin 11-51.*

Rapid Grinding. — Carboloy Co., Inc. Manual explaining one of the latest techniques for the rapid grinding of Carboloy tools. Describes and illustrates complete procedure, and is recommended by the publisher as a comprehensive and practical instruction book for carbide tool users. *Bulletin 11-52.*

Honing.—Hutto Machine Div. of Carborundum Co. 16-page booklet describing the general principles of Hutto patent type hones for production grinding. Floating cone principle of construction is explained as well as the principles of honing machine construction as related to finish and fit. The bulletin is illustrated with a number of cross-sectional views illustrating these principles. Selection of grit and bond of abrasive is related to the work being finished. *Bulletin 11-53.*

Automatic Coal Stokers. — Link-Belt Co. New 28-page book number 1619 covering automatic coal stokers for industrial and commercial use in capacities up to 300 h.p. *Bulletin 11-54.*

Pickling. —E. F. Houghton. A folder describing a new inhibitor, Acitrol No. 100, an electrolysis control which differentiates between the productive and non-productive galvanic couples present in a pickling solution. This powder inhibitor dissolves rapidly and leaves no greasy residue or stain on the steel. *Bulletin 11-55.*

Enameling Frits. — The Porcelain Enamel & Mfg. Co. An illustrated booklet describing unique porcelain enamel frits which are smelted continuously. More uniform color, greater opacity, better gloss and uniform burning are claimed as a result of this method of manufacture. *Bulletin 11-56.*

Heat Treatment.—Surface Combustion Co. A beautifully illustrated book which describes installations of standard types of furnaces for heat treating purposes, from the smallest to the specialized and most advanced designs. Also described are a number of pieces of auxiliary equipment for gas-fired radiant heating furnaces. *Bulletin 11-57.*

Flame Control.—Wheelco Instruments Co. An illustrated bulletin describing an instrument, Flame-Otrol, which is a safety device for protecting against failure of either the main or pilot burner for ovens or furnaces. *Bulletin 11-58.*

Indirect Industrial Lighting.—Silvray Lighting, Inc. Brochure, profusely illustrated, telling story of indirect illumination and its contribution to business and industrial progress. Contains many photographs of effective indirect lighting installations. *Bulletin 11-59.*

Synchronous Motors.—Allis-Chalmers Mfg. Co. 28-page bulletin covering construction and uses of coupled and engine type synchronous motors. Contains many illustrations. *Bulletin 11-60.*

Annealing in Controlled Atmospheres.—Continental Industrial Engineers, Inc. Illustrated publication of address by president of the Continental company. *Bulletin 11-61.*

Pickling Tanks.—Nukem Products Corp. Booklet explaining Basolit tank construction and illustrating several installations in various steel mills. Includes list of Basolit tank and floor installations. *Bulletin 11-62.*

Oven and Weather Thermometers.—Cooper Oven Thermometer Co. Catalog describing complete line of thermostatic dial thermometers used extensively in stove industry, as well as for other industrial uses. Contains illustrations and a sketch of the history of thermometer making. *Bulletin 11-63.*

Floor Repair and Building Maintenance.—Flexrock Co. Folder describing Ruggedwear Resurfacer. Includes illustrations, specifications and list of Flexrock customers. *Bulletin 11-64.*

Cylinders. — Hanna Engineering Works. Catalog for those wishing to consider applying an air cylinder to easily determine if a cylinder of a given diameter and length of stroke can be incorporated in their plans. Contains dimensions, capacities and illustrations of nearly every type cylinder to meet installation requirements. *Bulletin 11-65.*

Materials Handling Equipment. —Gifford-Wood Co. Catalog including, besides detailed descriptions of equipment, many tables and drawings which should prove valuable in planning and designing new, or modernizing old, materials handling equipment. *Bulletin 11-66.*

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yards; one horizontal boring, drilling and milling machine and spare parts (Schedule 9229), one power hacksaw and spare parts (Schedule 9235), one turret lathe (Schedule 9237), one comparator and measuring machine (Schedule 9242), motor-generator unit for plating service (Schedule 9246) for Puget Sound yard; one combined auxiliary air and circulating pump and spare parts (Schedule 9239) for Mare Island yard.

Smith Canning Co., Athena, Ore., food canner, plans one-story plant at Pendleton, Ore., where site has been donated by city. Cost over $60,000 with equipment.

Lodi Union High School District, Lodi, Cal., plans one-story vocational training shop at local school. Cost $50,000 with equipment. Financing is being arranged through Federal aid. Peter Sala, 2130 North Commerce Street, Stockton, Cal., is architect.

Bureau of Yards and Docks, Navy Department, Washington, asks bids until Dec. 9 for automatic equipment for converting four 300-hp. oil-fired boilers now at Mare Island Navy Yard, to full automatic operation and control for both natural gas and fue loil (Specifications 8376).

FOREIGN

National Oil Refineries, Ltd., Llandarcy, Wales, England, plans additions to oil refinery for large increase in capacity, including steel tank storage and distributing facilities. Cost over $500,000 with equipment.

Rickard-Ramore Gold Mines, Ltd., Concourse Building, Toronto, Ont., operating gold mining properties near Iroquois Falls, Ont., plans expansion and development, including installation of new equipment. Company has arranged for capital stock issue to total over $900,000, considerable part of fund to be used for purpose noted. W. H. C. McEachern is president.

Pyrotenax Co., Ltd., London, England, recently organized to manufacture heat-resisting electric cable and kindred wire products, has acquired about three acres at Hebburn-on-Tyne, England, and will proceed with construction of initial unit of new plant, one-story, totaling about 20,000 sq. ft. floor space. Cost close to $100,000 with equipment. Other units will be erected later.

Chesterfield Tube Co., Ltd., Chesterfield, England, manufacturer of steel tubing and allied products, has plans for one-story addition. Cost over $300,000 with machinery.

Dominion Foundries & Steel, Ltd., Depew Street, Hamilton, Ont., has let general contract to Piggott Construction Co., Piggott Building, for one-story addition, 100 x 125 ft. Cost over $100,000 with equipment.

Monterrey Iron & Steel Works, Monterrey, N.L., Mexico, has approved plans for expansion, including new foundry unit. Cost about $80,000 with equipment.

A Monument To Cast Iron

(CONTINUED FROM PAGE 45)

complete circuit of the dome, designed for the use of visitors and spectators. At a considerably lower level, surrounding the rotunda, a similar gallery is provided. The rotunda is 97 ft. 6 in. in diameter, with clear height from floor to top of dome canopy of 180 ft. 3 in., and connects the two wings of the Capitol used by Congress.

Moves 3 to 4 Inches

Subject to intermittent heat through the rays of the sun, causing natural expansion and contraction in the cast iron elements forming the massive dome, it is of interest to find that closely following the completion of the structure, official vibratory tests were made and became a matter of record. These were carried out during the hot summer days of 1865 by B. B. French, Jr., civil engineer, in cooperation with Prof. Henry, Smithsonian Institution, indicating, as the statistics point out, that the dome oscillated a distance of 3 to 4 in., during the ordinary sunshiny day at that season of the year. With the declining sun at dusk, the dome unit returned to its original position. Later similar experiments have gone to bear out these findings. The Capitol is located on a plateau, 88 ft. above the level of the Potomac River.

There have been no replacements in the basic cast iron material forming the dome in its 72 years of existence—a record that testifies to the enduring characteristics and exceptional economy of cast iron in an impressive way. Upkeep and maintenance have been primarily that of painting the structure at periodic intervals. About 4000 lb., or two tons, of paint are required for this work for the entire dome.

Reference has been made previously to the two domes of the Capitol. The first was designed by B. H. Latrobe, one of the architects for the rebuilding of the Government structures following the fire early in the nineteenth century. Before the dome was completed, he resigned his office and was succeeded by Charles Bulfinch, who, following the original plans, erected this first, or low dome, over the Capitol rotunda. It was formed of wood, covered with copper. The structure was regarded as fully completed in 1825.

In subsequent years, with the expansion of the Capitol building, it became necessary to have a larger and more imposing dome to balance the widespread structure. In the construction of the second dome, the unit that stands today, cast iron was selected as being the most desirable material for the entire structure. The dome was designed by Thomas U. Walker, architect, and erected under his supervision. The existing foundations of wood were reinforced and used for the new construction. About 20 years ago, however, all wood supports were removed and more substantial iron foundations provided.

From time to time in recent years, plans have been projected for an addition to the Capitol building on the East front, corresponding to the West front, which extends forward a considerable distance. With this expansion, as will ultimately come to pass, the cast iron dome will rest over the center of the enlarged building. This will give greater uniformity and symmetry to the entire structure, eliminating the present predominance of the iron dome on the eastern wing of the National Capitol.

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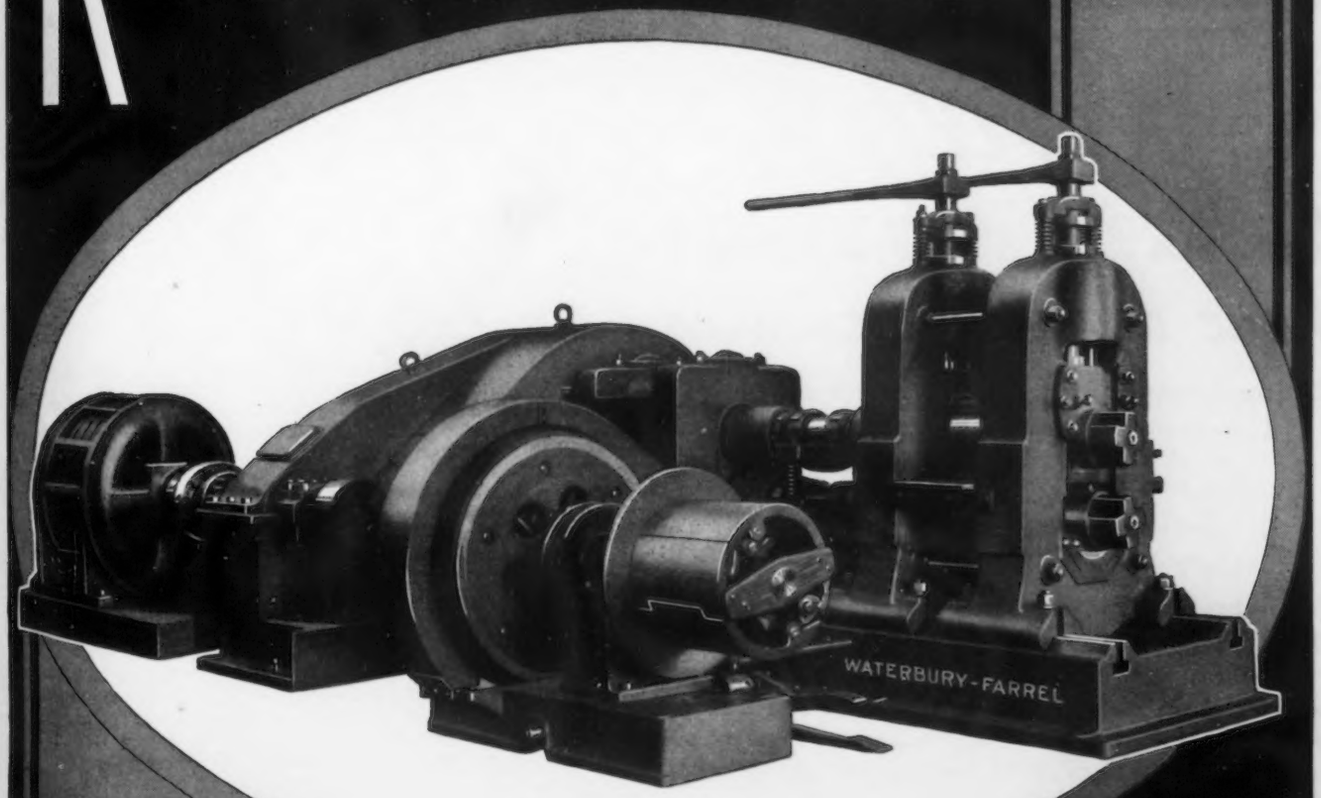

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Gibraltar

WITH things changing so rapidly these days, it is comforting to find something that stands as steadfast as a rock. We refer to the mind of that small Chicago machine shop proprietor who told us recently, *"Fifty years ago I decided I did not want The Iron Age, and will not change my mind now."*

We admire the man who makes up his mind and sticks to it, but we would be hurt no end if we found he was picking only on us and had fallen for newfangled things like stationary wash tubs, safety razors, low wheel bicycles, Welsbach mantles, and two-pants suits.

We are checking up on him to see if he is a genuine 24-kt. standpatter, and will expose him to public scorn if we catch him sitting in his parlor, leaning against his antimacassar and looking at Niagara Falls through one of those what-won't-they-get-up-next stereoscopes.

Pig Forceps

CANDIDATES for admission to The Iron Age circulation list are investigated as carefully as applicants for listing in the Almanach de Gotha. We check 'em for buying power, suitability, financial rating, etc., and are continually pop-eyed over the variety of products they make.

Take, for example, pig forceps, made by the Gabel Mfg. Co., Hawkeye, Iowa. We are inviting Gabel to subscribe so that we may claim coverage of the porcine obstetrical instrument field. It sounds imposing.

Then in Topeka, Kan., the Dairy Equipment Co. makes cow kickers; Thomas & Betts, Elizabeth, N. J., make hickeys; the Dooroscope Co., New York City, makes door lookouts for interviewing. Then there are broom holders, sparrow traps, cheese graters, jar lifters, rowing machines, bucks, etc.

The last-named are made by Hutchins & Hutchinson, Bristol, N. H. It would be interesting to know how these gentlemen got together. Did Mr. Hutchins keep looking and looking until he found a Hutchinson to hook up with, for the sake of euphony?

It Would Lay An Egg

BUT to get back to the main track—it strikes us that with a demand for such an incredible variety of products there is little to worry about state control of industry. Imagine asking the Committee for Light Industries for funds to erect a plant to make broom holders. *Broom holders be damned! Let them stand their brooms in a corner!*

That, of course, would cause irritation among the people who wanted broom holders, not to mention door lookouts, jar lifters, rowing machines, electric horses and the other little things that make life bearable. The first thing you know you would have a tidal wave of protest on your hands. You know the rest.

Kicker

ONE of the more or less loyal army of eighteen readers of this column complains that we talk too much about The Iron Age. The criticism is probably just, but there are certain things that must be told.

For instance, a salesman for a company selling to the field this paper serves asked us hesitantly to induce his boss to advertise here, *"but don't say that I said anything about it, as it would get me in bad.*

"They send out a lot of direct mail," he continued, *"but it doesn't seem to reach the men I have to sell to, and as I see most of them reading The Iron Age, it would help us salesmen if you could get them to advertise."*

This is not intended as a rabbit punch at direct mail. We use it ourselves and recommend it, but to reach the men with the ultimate say in placing orders there is nothing so effective as advertising in a good trade paper. As the manufacturing head of the biggest company in its line writes:

> *"Reading the advertising in The Iron Age is a quick way of keeping abreast of the times and in touch with the new things."*

Cosmic Critic

A POSTCARD informs us that Dr. Samuel D. Schmalhausen, author, is going to speak on, "Is Human Nature a Success or Failure?" We can hardly wait to find out whether it is thumbs up or down with the doc.

—A. H. D.